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DEVELOPMENT AND EVALUATION OF A SPEECH IMPROVEMENT PROGRAM FOR KINDERGARTEN AND FIRST-GRADE CHILDREN.
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A SPECIFIC APPROACH TO SPEECH LEARNING AND DEVELOPMENT WAS DESIGNED AND TESTED USING 56 EXPERIMENTAL AND CONTROL GROUP CLASSES OF VERY YOUNG CHILDREN IN KINDERGARTEN AND THE FIRST GRADE. AUDITORY DISCRIMINATION, ARTICULATION, AND READING AND SPELLING SKILLS WERE EMPHASIZED. ALTHOUGH ACTUAL SPEECH TRAINING WAS PROVIDED FOR ONLY 1 YEAR, THE PROGRESS OF EACH SUBJECT WAS FOLLOWED FOR A 3-YEAR PERIOD. INFORMATION FOR COMPARING THE TWO GROUPS WAS OBTAINED FROM TESTS ADMINISTERED BY THE CLASSROOM TEACHERS OR BY SPEECH CLINICIANS. SEVERAL STATISTICAL PROCEDURES WERE USED IN ANALYZING THE COLLECTED DATA. THE FIRST-GRADE AND OLDER KINDERGARTEN EXPERIMENTAL CLASSES HAD SIGNIFICANTLY HIGHER ARTICULATION SCORES AT THE END OF TRAINING THAN THOSE THAT DID NOT RECEIVE THE PROGRAM, AND THIS CONTINUED UNTIL THE END OF THE SECOND YEAR OF EXAMINATION WHEN BOTH GROUPS WERE SIMILAR. ON DISCRIMINATION, THE EXPERIMENTAL KINDERGARTEN GROUP HAD LOWER ERROR SCORES ONLY AT TERMINATION OF TRAINING. AT THE FIRST-GRADE LEVEL THERE WERE NO SIGNIFICANT DISCRIMINATION DIFFERENCES AT ANY EVALUATION PERIOD. THE EFFECTS OF THE PROGRAM ON READING AND SPELLING WERE POSITIVE. THIS PROJECT APPEARED TO BE PARTICULARLY HELPFUL FOR SELF-CORRECTION IN SPEECH AT THE KINDERGARTEN LEVEL AND FOR INCREASING TEACHER INSIGHT INTO EARLY SPEECH PROBLEMS. (JH)

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DEVELOPMENT AND EVALUATION OF A SPEECH IMPROVEMENT PROGRAM FOR KINDERGARTEN AND FIRST GRADE CHILDREN

Cooperative Research Project No. 620 (8255)

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Project Director: Margaret C. Byrne, Ph.D.

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Speech and Hearing Clinic
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Lawrence, Kansas

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Preface

One of the major problems of the speech clinician in the public schools is apportionment of time to children with speech deficits. In most school systems the clinician cannot schedule all children with error patterns. He must be content to see those who in his opinion can profit most from special speech work. The others, whose names go on waiting lists, may improve, or they may stabilize their errors so well that correction eventually is more time-consuming and possibly more frustrating to the clinician and to his clients.

Most speech clinicians and many school administrators who have utilized speech improvement training have reported that these programs are successful in improving the speech of young children. The present study was undertaken to determine the effects of a specific approach to speech learning that was carried out by classroom teachers.

This project could not have been undertaken without the very active support and cooperation of many groups and individuals. The administrators of the public schools of Wichita and Lawrence, Kansas, merit special mention. The experimental teachers who carried out the training contributed many hours and maintained interest in the project during the three-year period. The control teachers administered tests and permitted us to evaluate their classes as we wished. The speech clinicians gave us special kinds of information, scheduled the children whom we recommended for speech therapy, and provided excellent liaison with principals and teachers. Colleagues in the School of Education, in Speech Pathology, and in the Bureau of Child Research at the University of Kansas contributed their support and special talents to various phases of the Project.

The Director of Special Education of the Wichita Schools, the Director of the Speech and Hearing Program in the Lawrence School system, the Director of the Bureau of Child Research, at the University of Kansas, the clinicians who tested the children, the graduate assistants who worked on the Project, and the secretary who has been responsible for this manuscript - these deserve special thanks.

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CHAPTER I

INTRODUCTION

One goal of the language arts program for elementary school children is the development of normal patterns of oral communication. Articulation of speech sounds is an aspect of communication that has received considerable attention. Since the child must use the sounds of our language correctly if his ideas are to be understood by the listener, classroom teachers have been encouraged to refer the child with deviate articulation to the speech clinician for appropriate remedial work. The cooperation of teachers and clinicians has resulted in widespread interest in special programs designed to foster normal articulation in young children.

The range in speech proficiency among kindergarten and first grade children is wide. Some use all speech sounds accurately at all times, and others are so deficient that they are considered to have articulatory defects of a moderate to severe nature. A survey conducted in 1957-58 in the Lawrence, Kansas, Public Schools disclosed that 21 per cent of the kindergarten children and 18 per cent of the first graders either were enrolled in the speech correction program or were recommended for re-evaluation in a year because of articulatory inaccuracy.

Although inaccuracies are noted among many primary school children, the fact that others have developed normal patterns of articulation forces us to hypothesize about the reasons for the differences in speech learning. During the early months of a child's life he uses all speech sounds in his vocalizations. As he listens to those in his environment, he tries to imitate what he hears. One child in his initial attempts may approximate the normal speech he has heard. As he grows older, those first approximations may become stabilized as inaccuracies, or may change to correct production. Another child may imitate accurately in his early attempts and continue to use those phonemes. If his model has had normal articulatory patterns, his speech will be accurate. If he has heard and imitated deviate speech, he will reflect those errors in his articulation.

At present we cannot determine why children develop speech in a particular manner, although we know some of the variables influencing some groups. We recognize however that the speech of young children can be changed through the use of certain learning experiences. One of these is the speech improvement program. Some of these programs can be considered a part of a speech education curriculum, since they stress refinement of all aspects of oral communication, including articulation. In some schools the classroom teacher is responsible for speech improvement; in others, the speech clinician conducts the lessons; and in others, the clinician does some demonstrations but the teacher carries out most of the program. Some districts initiate the training at the kindergarten level, and others during the first grade. Some communities continue a special program throughout the elementary grades (5).

Although several rationales have been expressed both for and against speech improvement programs, the most frequent one on the positive side is prevention of speech defects and enrichment of one aspect of the language arts program. Teachers report its effectiveness in fostering good listening patterns. Some administrators feel that the program also improves reading skills. Those who favor speech improvement assume that normal articulation per se is a desirable skill for all children, and that the school environment can be structured to foster and accelerate accurate articulation learning.

Those who oppose speech improvement programs that draw attention to articulation have equally strong reasons. They emphasize that maturation will take care of many articulation problems. Most children with error patterns will outgrow their deviations and the others will need speech therapy regardless of early attempts through a speech improvement program. In addition, they feel that the limited time of the speech clinician should not be spent with minor articulation errors when his time is needed for those children who cannot function adequately without lengthy, time-consuming therapy.

Because of these controversial issues this study was initiated. It was designed to determine the effects of a specific speech improvement program on the auditory discrimination, articulation, reading, and spelling skills of children. The program, which stressed listening, imitation of normal articulation, and some practice, was initiated at both the kindergarten and first grade levels. Classroom teachers who had volunteered to be either experimental or control teachers were randomly selected from schools classified as high, middle, and low for their general socioeconomic status. These teachers presented the training to their classes daily for 21 weeks. Although the speech improvement program was given for one year only, the children in the experimental and control classes were followed for a three-year period.

The following questions were to be answered through this research project:

1. What are the effects of a specific speech improvement program on the auditory discrimination and articulation skills of children in the kindergarten and first grade? Are there statistically significant gains one and two years after the completion of the program?
2. Are the effects of the program contingent upon the age, sex, and intelligence of the child? Does the general socioeconomic status influence the results of the training?
3. At the end of the second grade do children who received speech improvement in kindergarten show more improvement in auditory discrimination and articulation skills than children who received the program in the first grade?
4. What are the effects of the program on the reading readiness of children in the kindergarten sample and the reading achievement of those in the first grade group?
5. What are the effects of the program on the spelling skills of children in the first grade sample?
6. Is there any acceleration in reading skills that can be measured one and two years after the completion of the program?

CHAPTER II

REVIEW OF RELATED LITERATURE

Speech improvement programs have been described in the literature as early as 1925. They have included all types of speech activities, from forensics and dramatics, to specific work on sound production. An investigation (6) conducted at Louisiana State University, in 1956 to determine the current status of speech improvement in the elementary classrooms in the United States revealed that at least 121 classroom teachers were directly involved in such programs. Another 78 persons were actively engaged in this training as consultants and advisors. Although the survey was limited in scope, it provided some information about the participation of classroom teachers in such programs.

In the 1959 study (5) of public school speech and hearing services the status of speech improvement was included as an area of investigation. A group of 245 teachers and speech clinicians who were engaged in speech improvement programs completed a questionnaire about current participation in, approaches to, and evaluation of their programs. Although this sample also was small, the information provided by the group suggested that both teachers and clinicians were enthusiastic about their programs. The majority of the participants reported that such approaches eliminated minor articulation and voice problems, and decreased the number of children requiring therapy.

The study committee then formulated the following recommendations:

1. Speech improvement should be included in curriculum for kindergarten through twelfth grade
2. Specially trained personnel should direct the program
3. Classroom teachers who carry out the program should receive in-service training

At present a special committee of the American Speech and Hearing Association is studying the question of the role of the speech clinician in regard to speech improvement.

Although a few studies have evaluated the efficacy of speech improvement classes, most programs have been initiated and continued because teachers and administrators felt that the participating classes developed better oral communication. Syllabi have been prepared and used by state speech organizations, by individual teachers of speech, by groups of speech clinicians, and by language arts teachers. The term speech improvement is used by these groups to cover a wide variety of activities, depending upon the training and philosophy of the personnel.

A careful study was conducted by Betty Ann Wilson (21) with kindergarten classes in 1951-52. Wilson's program stressed the identification and production of selected consonants in the initial, medial, and final positions in words. She prepared the materials and gave the first of the five lessons on each sound to her five experimental classes. The teachers carried out the other four lessons. It was a daily program which extended for 12 weeks. Wilson found that articulation of sounds that had received special attention and those that had not were significantly improved among her experimental group. She found however no differences between her experimental and control samples in their reading readiness scores.

One syllabus (18) developed by a group of speech clinicians has been used widely in the Rochester, New York, first grades. It required a demonstration lesson each week in the classroom by the speech clinician and it provided the follow-up lessons to be conducted daily by the classroom teacher. The program was designed "to prevent speech defects and to encourage the enrichment of speech skills in children" (18, p.1). The objective of the lessons was to teach children to listen, recognize, and discriminate among sounds. Although no published reports of the efficacy of the program are available, a personal communication from the director of the program revealed that the incidence of articulation errors at the beginning of the third grade was 13 per cent for those who had participated, and 20 per cent for those who had not. The number of children in the speech improvement program who needed to be enrolled in speech correction was one-third less than the number in the control group who had had no similar program.

One aspect of the Armstrong County study (12) dealt with the effects of a speech improvement program for first grade children. A staff of speech clinicians provided one thirty-minute lesson per week in 32 first grade classes. Classroom teachers observed the lessons and were encouraged to continue them for a short period daily. Ten sounds were stressed, each for approximately four weeks. Van Riper's approach to sound learning provided the structure of the program. Sommers found that the children with one or more errors in classes that received the program improved significantly in articulation skill after nine months. In addition those who received the program, whether or not they had any articulation errors, had higher reading factor scores than their controls on the Primary Reading Profiles Test (14). Reading comprehension however was not affected by the speech improvement program.

The effectiveness of a phonic training program on speech sound discrimination and on spelling performance among second grade children was carried out by Empress Zedler (22) in 1953. She developed the Tommy Stories as her principal tool. Lessons were conducted twice a week for 30 minutes each by five speech clinicians over a 14-week period. She found that spelling and auditory discrimination were significantly improved in her experimental groups. She also found a high correlation between the spelling and discrimination performance of both the experimental and control samples.

Some of the data from the Wilson (21) and Steer and Drexler (13) studies were utilized by Andersland (1) in 1959 to evaluate selected environmental factors which might be related to speech improvement training. The two factors with which we are concerned are socioeconomic level and parental education. Andersland found significant correlations between the socioeconomic and educational levels of the families in the original study. She also found that those in the three socioeconomic groups who had received the speech improvement program at the kindergarten level did not differ in articulatory skills five years after the termination of the program. Highly significant differences were found however between the children who had and those who had not participated in the training from the low economic group. Andersland concluded that the speech improvement program raised the level of articulatory skill among children in the low economic group so that the latter were comparable to children in the high group. She felt that her follow-up study demonstrated the benefits of such programs to children in low socioeconomic groups.

During the past ten years many patterns have been followed in the presentation of speech improvement programs. Those reported in this review have stressed an ear training approach. Both classroom teachers and clinicians have conducted the lessons. Kindergarten, first, or second grade classes have been given training. Only one study group was re-evaluated five years after the termination of a speech improvement program. The positive effects of a program on articulation have been noted by most writers, but there is still considerable controversy about its influence on reading skills and spelling.

CHAPTER III

PURPOSE OF THE STUDY, POPULATION, AND PROCEDURES

Purpose

This study was initiated primarily to determine the effects of a specific approach to speech improvement on selected skills that are stressed in the primary school program. In addition the project staff wanted to evaluate whether classroom teachers with minimal guidance could conduct the program without weekly demonstrations by speech clinicians. We also hoped to determine whether this special training would reduce the number of children who needed a speech correction program.

The term Speech Improvement has multiple meanings. In this study it is considered a continuous ongoing process of speech and language learning and refinement. It was group work carried out daily by teachers with whole classes. Its objectives were to improve the general articulatory level of performance of the classes and to minimize or correct minor defects of some of the individuals in the groups.

Population

The sample of the population was obtained from two communities in Kansas: Wichita, a large urban center, and Lawrence, a small university town. These communities were selected for several reasons. The school administrators were willing to permit us to follow large groups of children for a three-year period. In addition, the teachers were eager to participate in a planned study dealing with speech improvement.

In Wichita seven administrators independently categorized all 72 elementary schools as high, middle, or low in socioeconomic status. They considered variables such as the housing from which the children came, the general level of income, employment of the father, and education of the parents. Although the criteria were general, these administrators knew the areas in which the schools were located. The list was then compiled by the Director of Special Education, who later selected the Wichita teachers.

Such a lengthy procedure was not necessary for the ten schools in Lawrence. The Project Staff and the Director of the Speech and Hearing Program were able to assign schools to the three categories without difficulty, using the criteria employed by the Wichita administrators. Teachers were chosen by the Director of the Speech and Hearing Program.

In May, 1959, teachers who wanted to participate in the study volunteered for the program. From the list of volunteers ten kindergarten and eight first grade teachers were randomly selected from high, middle, and low socioeconomic schools to be experimental teachers. Control teachers were similarly chosen from the remaining names, with the added restriction that none of the Wichita teachers could be located in buildings where an experimental teacher had been selected.

A total of 56 classes comprised the sample. Both morning and afternoon classes of the kindergarten teachers were utilized. Twenty-eight kindergarten and 12 first grade classes were from Wichita Public Schools and 12 kindergarten and four first grade classes from the Lawrence Public Schools. In the kindergarten sample 12 classes were considered high, 16 middle, and 12 low socioeconomic level. Among the first grade classes four were high, 10 middle, and two were low.

During the first year of the study children were randomly assigned to teachers without regard to any selection procedure. The only consideration for morning and afternoon kindergarten sections was the age factor. The younger children were enrolled in morning classes and the older ones in afternoon groups.

Although we were evaluating classes of children during the first year, these classes did not remain intact after the one-year period. The children were assigned to new classes at the beginning of each of the last two years of the study. In addition, if children transferred to other schools during the three-year period, they were dropped from the study at the time of transfer.

Procedures

Speech Improvement Program. The Project Director wrote a detailed syllabus for the teachers. The unit for the first week emphasized the development of adequate listening patterns and identification of the speech mechanism. The remaining lessons stressed specific sounds. The [p] which is used correctly by most children was reviewed during the second week (Appendix A). A minimum of one week was spent on each of the sounds which Templin (16, ch. 3) determined were learned last by children: [k], [s], [z], [g], [ʃ], [l], [f], [v], [tʃ], [dʒ], [r], [ð], and [θ]. The Van Riper sequence of ear training was followed, with a minimum of one day devoted to each of the following steps for each sound: identification of the sound, listening for it, discrimination between the sound and those sounds with which children tend to confuse it, production of the new sound, and carry-over in key phrases (19, ch. 7). An outline of the approach utilized for each sound is given in Appendix B. Review weeks were also scheduled, during which the activities stressed all the sounds of the preceding four or five weeks. The order of presentation and the objects used for identification of the sounds are outlined in Appendix C.

The teachers spent a minimum of 15 and a maximum of 40 minutes daily on the lessons. In addition they were encouraged to incorporate the speech work in as many other school activities as possible. As a result most of the kindergarten teachers used the syllabus as a "core" curriculum, with the sound of the week determining their activities for art, music, physical education, arithmetic and story telling.

Since the experimental teachers were located in eighteen different buildings, a complete set of all materials to be used with the syllabus was assembled by the Project Staff for each teacher. These included filmstrips, records, story books, objects to represent each sound, crayons, pictures, hand mirrors for each child, and a class scrap book. The cost of each set of purchased materials, was about $15.00. A general list of the items is provided in Appendix D.

In-Service Training of the Teachers. Since the speech improvement lessons did not begin until the first week of November, the teachers had time to become acquainted with the syllabus and the materials. During the first year several work-shop sessions were held. Separate but similar meetings were scheduled for the Wichita and Lawrence teachers. Each group had one full day of training, after-school meetings once a month, and a minimum of two classroom visits by the Project Director.

The one-day workshops had multiple purposes. The primary goals were to help the teachers to understand our philosophy of speech improvement, to provide a brief description of types of speech errors in kindergarten and first grade, to describe and illustrate concepts such as sound discrimination, and to demonstrate how to use the materials. A set of instructions was included in the syllabus (Appendix E), so that the teachers could readily refer to them during the ensuing months.

The one-hour monthly meetings were arranged so that half the time was spent in answering the teachers' questions and the other half on specific topics. For instance, the sessions preceding the initiation of the program were devoted to further explanations of the procedures. The teacher evaluation form (Appendix F) was also discussed. After the training started the tests to be administered by the teachers were explained. Another discussion topic was approaches to the teaching of reading and their comparisons with the presentation of sounds in this program.

The Project Director's visits to each class provided first-hand information about the responsiveness of the children, problems of management, adequacy of the materials, and the teacher's interpretation of the instructions. The time of the visits was always scheduled by prior arrangement with the teachers. Each of them carried out the day's lesson and then we exchanged recommendations that might improve the program.

__Tests.__ During the three-year period several types of tests were administered. The Speech Battery (Appendix G) included a picture articulation test of the thirteen sounds in the program, an imitation test which utilized the twenty blend words with the lowest per cent of correct responses by eight-year olds in Templin's test (16, p. 164-5), a test of the speech sounds in isolation, and the Wepman Auditory Discrimination Test Forms I and II (20). These were given at the beginning and end of each of the three school years. Directions for administering the tests are given in Appendix H. Scores for the speech tests were the number of correct responses. The picture test and the imitation test scores of each child were combined, to provide another measure of his articulatory accuracy. The number of errors in the __X__ column was the score for the auditory discrimination test.

The classroom teachers administered most of the other tests. The group intelligence test for the Wichita sample was the California Mental Maturity Test (15), given at the end of the first semester of the kindergarten year. The Lorge-Thorndike (10) was given to the Lawrence group at the end of kindergarten. In Wichita mental maturity was measured by the Otis Quick-Scoring Mental Ability Test, Alpha Form (11) for the first grade sample and by the Detroit Beginning First Grade Intelligence Test for kindergarten children (4). The Lee-Clark Reading Readiness Test (7) was given to the Wichita kindergarten sample at the beginning of the second year of the study, and during the third year the Primary Reading Profiles Test (14) was administered. The Wichita first grade group has had three achievement tests - Metropolitan Primary I Battery at the end of the first year, Metropolitan Primary II Battery (2) at the beginning of the second year, and the Iowa Tests of Basic Skills (9) at the beginning of the third year. The Lawrence kindergarten group received no achievement tests but the first grade sample was given the Science Research Associates Achievement Series R 1-2 at the end of the first year of the study and Form 2-4 (17) during the third year.

The principals of the schools and the speech clinicians obtained other types of information for the Project Staff. The former provided birthdates, and, through questionnaires, data about the education and occupations of the parents of the children. The clinicians obtained the reports of the hearing tests, which had been given by the school nurses.

Examiner Reliability. Since ten speech clinicians were engaged in the speech testing during the three-year period, reliability of judgements was checked prior to each testing period. After a discussion about the range of normal phonetic production, tape recordings of five children were played. Judgements about the accuracy of the phonemes were made independently. Percentages of agreement of each examiner with the Director of the Project ranged from 84 to 95 per cent. When it was feasible the examiner who tested a child in September did not re-test him the following May. Because of the size of the sample and the unfamiliarity of the examiners with the children, it was felt that the influence of bias was minimal.

Statistical Treatment of the Data. Several statistical procedures were utilized. The most frequent was Lindquist's Treatments by Subjects Design (8, ch. 6), which was used to test the significance of treatments effects (Appendix I). Although this design is employed primarily when treatments are administered to the same subjects, we made the assumption that the classes in the E and C sub-samples were the same. The subjects had been randomly assigned to the classes, and any of the classes in the E group could have been in the C group. Our concern was to select a design that would provide the most precision. For information related to socioeconomic levels the design (Appendix I) was

Lindquist's Treatments by Levels (8,ch. 5). The mean scores of the classes were employed in these formulas, rather than individual scores.

Other procedures were also utilized. When it was appropriate, correlations between test scores were computed for each class of children (3, ch. 7). The _t_-test of mean differences was used for reading test scores of the E and C first grade classes in Lawrence (3, ch. 8). This statistic was chosen since there were only two E's and two C's, all in the middle socioeconomic level, with one E and one C in each of the two buildings.

The criterion for significance for all statistical procedures was the .05 level of confidence.

CHAPTER IV

RESULTS

Because of the size of the sample and the amount of data that has been processed over the three-year study period, the results have been organized in relation to the original first grade and original kindergarten classes. Information will be presented concerning the effects of the training on articulation, auditory discrimination, reading readiness, reading, and spelling. The influence of selected variables, such as socioeconomic level, age, intelligence, sex, and maternal occupations will be considered. Appropriate comparisons of the two grade samples and the teacher evaluations will receive separate consideration. Tables with the results of the statistical analyses will be provided in Appendix J, rather than in the text.

First Grade Sample

General Information. During the study many children from both the E and C sub-samples transferred to other schools. In September, 1959, 345 children were given speech tests. Two years later only 227 of the original sample were still enrolled in the same schools where they began their first grade program. Thus, less than two-thirds of the original sample were available for testing. Figures in Table 1 show the decrement.

Hearing tests were given to all the children in the fall term of the first year of the study. Only three had hearing losses in the better ear of 25 d.b. or higher.

An overview of the education of parents of the children in the study can be obtained from data in Table 2. Almost two-fifths of the fathers have had some senior high school training, almost one-half some college work, ten per cent have had post-graduate college training, and about five per cent have had less than a tenth-grade education. Mothers fall into similar categories, except for the lower percentage who have post-graduate education.

Since age and intelligence are variables which affect learning, class means of the C.A., I.Q., and M.A., for the E and C classes were computed and analyzed for mean differences. Table 3 provides the results of the _F_ tests. On the basis of these analyses we can assume that the E and C sub-samples were similar with respect to these measurements prior to the treatment. The ranges of mean C.A.'s, I.Q.'s, and M.A.'s are in Table 4.

Speech Tests. Speech tests were administered before the initiation of the program, at its conclusion, at the beginning and end of the second year, and at the beginning of the third year. The picture stimulation test and the imitation test were given five times. The test of speech sounds in isolation was administered only during the first year. For each set of tests the school means of the E and C sub-samples were compared. In Table 5 the results for the five periods of testing are given. The E and C sub-samples were similar in articulation prior to the training. Immediately after the termination of the program the E classes had significantly higher mean scores on the picture test than the

C classes. Four months later a similar relationship was obtained, but the level of significance had dropped from .01 to .05 in the four-month interim. When the two scores for the picture and imitation tests for May, 1960, were combined, mean differences between the E and C sub-samples were significant at the .05 level. No other differences between the sub-samples were noted on the other speech tests, or in the combination scores for ensuing test periods. Thus we can say that the higher scores of the E classes following the training were not maintained. By the end of the second year the two sub-samples were similar in speech performance.

Another way of looking at the data was to determine how many children had perfect picture stimulation scores for each of the testing periods. From an inspection of the percentages in Table 6 we can make a few observations about the sub-samples. First of all the first grade E's had the same percentage of perfect scores as the C's at the beginning of the program. By the end of the training and four months later the E sub-sample had about one and a half as many children with perfect articulation as the C sub-sample. At the end of the second and beginning of the third grade the percentages for the two sub-samples were similar.

Auditory Discrimination Test. The Wepman Auditory Discrimination Test was administered five times to this sub-sample. Form I was always used in the fall and Form II in the spring. The F-values in Table 7 indicate that the E and C sub-samples did not differ from one another at any testing period.

The tests of many children in these sub-samples were judged invalid by Wepman's criteria. In Table 8 the percentages of invalid tests are given. Approximately one-fifth of beginning first graders had invalid tests. By the end of the school year the per cent was less than five; but by September, 1961, all children in these sub-samples could take the test adequately. The E sub-sample had fewer invalid tests than the C sub-sample however at the end of the training and four months later.

Relationship of Selected Variables to Articulation and Discrimination.

Socioeconomic Level. The speech and discrimination test scores were evaluated to determine the effects of the training on the three socioeconomic levels. The results (Table 9) indicate that levels affected only the discrimination test. Mean differences between and within the three levels were significant for all combinations, except for Levels I and II, C sub-sample, and Levels I and II, E sub-sample (Table 10).

The percentages of perfect picture test scores by socioeconomic classifications were also computed (Table 6). The range of perfect scores for the E sub-groups was 22 to 35 per cent in September, 1959. The percentages did not increase with each higher level of socioeconomic status, however. By the end of the program the low and middle sub-groups had almost doubled their percentages of perfect scores, and the high group had improved from 28 to 71 per cent. By the beginning of second grade, the lows were performing as well as the middle's, and the high's continued to be better than both of them. The same trend continued during the rest of the study.

In the C sub-groups a considerable amount of inconsistency was present. During the first year the three levels seemed to be comparable. At the beginning of the second year the low and high samples had similar percentages of perfect scores. Nine months later the middle group moved ahead of both the low's and high's. At the beginning of the third year the middle and high groups were comparable and the low group dropped. One factor that may account for the decrement in the low group was the small N and the fact that those children who transferred to other schools were those with perfect speech scores.

Although the trends for the sub-groups were similar, the middle and high groups of the E sub-sample had more children with perfect scores than these two levels in the C sub-sample. The largest differences occurred at the end of the training and at the beginning of the second year. Data from the final testing of the E sub-groups would indicate that the training program and other variables permitted the low economic group to improve to the level of the middle group and the high sub-group to achieve far greater accuracy than the other two levels.

The percentages of invalid discrimination tests for each economic level are given in Table 8. In September, 1959, the low socioeconomic group in both the E and C sub-samples had the fewest invalid tests. At the end of the training the percentage of invalid tests for the low E had been cut by one-third, but the low C section remained stable. A considerable decrement was noted in the results of the May, 1960 tests for both the middle and high economic levels. At the beginning of the third year children in all economic levels demonstrated their abilities to take this test.

Age. Pearson r's based on May, 1960 data, were computed between the picture test scores and C.A.'s for each class. The range for the 16 classes was -.354 to +.338, with no significant r's (Table 11).

Intelligence. Picture test data for September, 1960, and I.Q. scores were also compared. Only two of the sixteen r's were significant, one indicating a positive and the other a negative relationship (Table 12). Both schools with significant r's were part of the C group.

Since there is a question about the relationship of intelligence to both good and poor articulation, the lowest quartile scores for each class on the picture test in September, 1960, were compared with the children's I.Q.'s. A similar procedure was followed with the highest quartile picture test scores. The r's in Table 13 indicate that only one was significant but low--between the low speech scores and I.Q.'s for the E sub-sample. Since the paired speech and I.Q. scores in this E group showed significant correlations, we might ask whether the combination of a training program and intelligence tended to sort out those who had the lowest speech scores.

Sex. Data from the Speech Battery were analyzed to determine whether boys in the E sub-sample had higher scores than those in the C group; and whether there were differences between girls and boys in the E and C sub-samples. From the F-values in Table 14 it appears that on both the picture and combined tests the boys in the E classes had significantly higher scores than those in the C group. No differences were noted however between the scores of sub-samples of boys and sub-samples of girls in the C or in the E sections (Table 15).

Similar comparisons of the performance of the sexes on the discrimination test were also made. The F-values in Tables 14 and 15 indicate that boys and girls within and between the E and C sub-samples had similar error scores on this test.

Maternal Occupations. Since there is considerable controversy about the importance of the mother's remaining in the home during the early years of the child's life, an attempt was made to determine how many of the mothers were working during the first year of the study. We found that less than seven per cent of the mothers in the high level were working, but almost 20 per cent of those in the middle and low groups (Table 16). Figures are comparable for the E and C sub-samples, except for the low E and C sections. The percentages of working mothers in the low group may be an indicator that cultural influences were different for the families of the two schools involved. The fact that more than twice as many mothers of children in the E school were working, in comparison with those in the C school, should be considered in evaluating the lack of differentiation between the two schools on most tests.

Reading Achievement. Because the speech improvement program may be considered complementary to phonics, we thought the E classes might develop some skills which would contribute to reading competency. The Metropolitan Primary I Battery therefore was given toward the end of the Speech Improvement Program to the Wichita sample. On the Word Knowledge Section the mean scores of all E classes were higher than their Controls; on Word Discrimination four E classes did better than their C's; and on Reading only three E classes attained higher scores. However, the F-values (Table 17) indicate that only on Word Knowledge were the E classes significantly better than the C's.

The following September the same children received the Metropolitan Primary II Battery. On Word Knowledge and Word Discrimination five of the six E classes had higher means, and four E's had the higher means on Reading Comprehension. Statistical analysis (Table 17) however indicates no significant differences between the E and C sub-samples on the three tests.

At the beginning of the third year these children were given the Iowa Tests of Basic Skills. F-values in Table 17 are nonsignificant. Although the same trend which was noted on the previous tests continued, other influences have no doubt contributed to lack of differentiation between the E and C sub-samples. The test itself is more complex and is tapping characteristics that reflect the comprehension of the children. In addition, the fact that the children in the original E and C sub-samples had been assigned to many different teachers within the schools should be considered in interpreting these data.

The four first grades in Lawrence were administered the SRA Achievement Series. The *t*-test was used to determine any differences between the E and C sub-samples on the four sections of the R 1-2 test. On the Language Perception section the E group mean was significantly higher than the C group mean. No differences were noted on any of the other three sections (Table 18).

The SRA 2-4 was given to the same children in the Fall, 1961. Although the E group means were higher on both the Comprehension and Vocabulary Sections, the *t*-tests indicated no significant differences between the two sub-samples (Table 18).

Spelling. Only one spelling test was used in this study. The test from the Metropolitan Primary II Battery was given to the Wichita sample at the beginning of the second year. Although five of the six E schools had higher means than their C's, performance was not sufficiently high to differentiate between the two sub-samples (Table 17).

In order to determine whether there was any relationship between the spelling and speech scores, correlations were computed for the September, 1960, data. None of the r's were significant (Table 19). In three of the 12 schools the r's were negative. For the children in this study whether or not they had the special training, performance on these spelling and speech tests was not significantly related.

Kindergarten Sample

General Information. The size of this sample dropped from 1021 to 433 in the three-year period. Less than one-half of the children in the first speech testing were still enrolled in their original schools after three years (Table 1). The proportion of E's and C's remained stable, however.

Reports of the hearing tests were obtained from the nurses' files. Only three children had average hearing losses in the better ear of 25 d.b. or higher.

The educational status of the parents of this sample was similar to that of the first grade group (Table 2). About 11 per cent of the fathers had post-graduate training, 36 per cent had some college education, 33 per cent had senior high school background, and the rest had some education below the tenth grade. Among the mothers there were more with high school educations and fewer with post-graduate training.

Mean C.A.'s, M.A.'s, and I.Q.'s for the E and C classes were obtained and analyzed. The results (Table 3) indicate that on these three items the E and C sub-samples could not be differentiated. Ranges of these means are provided in Table 4.

Speech Tests. The Speech Battery was administered six times - at the beginning and end of each school year. In Table 20 the *F* test results are given. Prior to the training the E and C sub-samples did not differ from one another on the picture, isolated sounds, and imitation tests. At the end of the program the total E sub-sample had significantly higher scores on the tests of isolated sounds and imitation. Since children in the A.M. kindergartens were about four months younger than the P.M. sections, the data were analysed further. The A.M. E and C sub-samples did not differ from one another on any of the four tests. However, the E P.M. sub-samples had significantly higher mean scores on all of the tests than the C sub-samples. Four months later although the younger and older children were now together in first grade classes the results indicate that the total E kindergarten sub-sample scores were significantly higher than the C's. Additional modification of the speech of the younger E group probably occurred during the summer months.

By the end of the second year the differences on the speech tests of the E and C groups had diminished. For the May, 1961, testing none of the *F*'s reached a significance level. The same trend continued during the third year. Other factors, such as the phonics program and speech correction enrollment, contributed to the levelling-off of differences between the two sub-samples.

Percentages of perfect picture test scores for the E and C sub-samples are given in Table 21. The two groups were comparable in September, 1959. Considerable acceleration was noted in the E sub-sample immediately following the training and four months later. By the end ofthe second year however the E and C sub-samples had similar numbers of children with perfect articulation.

Auditory Discrimination Test. Forms I and II of the Wepman Auditory Discrimination Test were given alternately during the three-year period. The only significant F occurred at the end of the treatment, in May, 1960 (Table 7). At no other test period did the E sub-sample have significantly lower scores.

One factor that should be noted is the number of children who had invalid tests, using Wepman's criteria. A gradual decrement in invalid tests can be observed in Table 22. At the beginning of kindergarten the tests of more than one-half of both samples could not be counted. At the end of the year the percentages of invalid tests for the E and C sub-samples dropped to 22.0 and 36.0 respectively. For only one period, May, 1961, did the C sub-samples have fewer invalid tests than the E group. Although the trend toward fewer invalid tests was more characteristic of the E sub-samples, the scores of children in the two sub-samples who had valid tests were comparable for all testing periods, except May, 1960.

Relationship of Selected Variables to Articulation and Discrimination.

Socioeconomic Levels. Lindquist's Treatments by Levels Design (8, ch. 5) was utilized to evaluate the effects of the training on the three socioeconomic sub-groups. Data in Table 9 indicate that the effects of the treatment did not differ among the three levels for the picture test. On the isolated sounds and discrimination tests the *F*'s were significant, in favor of the E sub-sample. Differences between Levels I and II and Levels II and III in both the E and C sub-samples contributed to the significance of the *F* on the discrimination test (Table 10). Differences between Levels I and III in the E sub-samples, and between E and C sub-groups at Level II were responsible for the significant *F* in the isolated sounds test.

A review of the perfect speech scores among the kindergarten E and C sub-groups indicates some general trends (Table 11). For both sub-samples the percentages for the low socioeconomic segment were always the least at each testing period. Usually those in the middle segment were next lowest, and the high's had the most perfect scores. The per cent of children in the low E groups with perfect scores at the end of the training and four months later was almost double the per cent in the C sub-sample, however. At no point do the percentages of perfect scores equalize for all three socioeconomic levels in either the E or the C sub-samples. Probably the number of Negro children who were a part of the low socioeconomic group accounts for fewer children with perfect scores in that segment. The prevalence of [θ], [l], and [r], inaccuracies, which reflect the cultural environment of the children, cannot be overlooked.

The percentages of invalid discrimination tests (Table 22) increased from the high to the low sub-groups. The low groups in both the E and the C sub-sample were unable to perform as well as the other two economic levels. The low's were about one year behind the middle's and high's in number of children who could take this test.

Age. Pearson *r*'s were computed between the picture test scores and C.A.'s for each class. Two of the 40 *r*'s were significant (Table 11). Since we might have expected these on the basis of chance, we can assume that the age of the children in each class did not correlate with the picture articulation test scores.

Intelligence. In order to determine any significant relationship between intelligence and articulation, *r*'s were computed between I.Q. and picture test scores (Table 12). Only two of the 20 *r*'s were significant, but neither was high. One of the two could have been a chance occurrence.

The lowest and highest quartiles on the picture test for each class were evaluated further. Pearson *r*'s were computed between those picture test scores and I.Q.'s. For the highest quartile, the *r*'s were not significant, but for the lowest quartile of the E sub-sample the r was significant but low (Table 13). Since the same relationships were noted for the first grade sub-samples, our conjecture about the influence of training and intelligence on the speech scores is heightened.

Sex. In order to determine whether boys in the E classes had higher speech and lower discrimination test scores than the boys in the C classes, F-tests were computed (Table 14). Similar comparisons were made for the girls. The scores of the A.M. boys in the E sub-sample were similar to the boys in the C group; the girls likewise had scores that were not different. In the P.M. groups however the E boys had significantly higher scores than the C boys on the picture, imitation, and combined tests. The E girls had significantly better scores than the C girls on the discrimination test.

Similar comparisons were made of the two sexes within the C sub-samples and within the E group (Table 15). In the P.M. sections the C girls had higher scores than the C boys on all the speech tests; but within the experimental sub-sample the girls and boys had comparable scores.

On the basis of these types of comparisons we might assume that the older kindergarten girls had better speech than the older boys. When training was provided the boys' speech improved to a point that was comparable to that of the girls, and more accurate than that of the boys who had no special training.

Occupations of Mothers. The percentages of working mothers increased as the economic level decreased, just as with the first grade sample (Table 16). About 10 per cent of the mother in the high group reported that they were working, about 15 per cent of the middle; and almost 30 per cent of those in the low group. Since we don't know whether the work was full-time, or whether the mothers had temporary positions, we can only report that during the first year of the study about one-sixth of the mothers of the kindergarten sample considered themselves employed.

Reading Readiness. The Wichita kindergarten sample was given the Lee-Clark Reading Readiness Test at the beginning of the second year. No differences were found between the scores of the E and C sub-samples (Table 23). Since this test was given only a few months after the termination of the training, we can assume that this program did not influence the performance of the E sub-sample on this test.

[illegible] September, 1960, were correlated for each class to determine any significant relationships. Five of the 14 *r*'s were significant but low (Table 24).

Since some differences in the performances of boys and girls were noted on the speech tests, the question of whether similar relationships would be found on the reading readiness test was investigated. Reading readiness scores of the sexes within and between the E and C sub-samples were analyzed. Significant *F*'s in favor of the girls were obtained for both the within E and within C sub-samples (Table 25). The effect of the treatment however did not account for the higher scores of the E sub-samples ofgirls, since the C sub-samples performed in a similar manner. The girls in both sub-samples did better than the boys.

Reading. The Primary Reading Profiles Test was given to the Wichita sample at the beginning of the third year. F tests for the five sections were not significant (Table 23). The influence of the training was not sufficient to permit the E sub-sample to perform at a higher level than the C sub-sample.

Comparison of Performance of the First Grade and Kindergarten Sub-Samples

Several types of comparisons of the two samples were carried out, in order to determine whether the training program was more effective at one grade level than at the other. The first question to be answered was whether the kindergarten E sub-sample had higher speech and discrimination scores than the first grade E sub-sample at the end of the second grade. One might not expect that the scores would be comparable, since the former group was two years removed from the training, and the latter, only one year. Scores from seven schools from each of the two sub-samples were utilized. The F test indicated no significant differences (Table 26). Comparisons of data from the preceding years resulted in similar findings.

During the three-year period certain children from the entire sample were enrolled in a speech correction program. Criteria were established for referral to the clinical program prior to testing each September, and at the termination of the study in April, 1962. Since both communities have had very successful speech correction programs, we did not wish to jeopardize the role of the clinicians in either city by denying services for such a large sample. In Wichita lists of referrals were prepared for the clinicians, who then scheduled the children in group therapy twice a week. In Lawrence children were recommended by the examiners for the Project, and other children from the study were also included at the discretion of the school clinicians. These children also received group speech instruction twice weekly.

The following criteria had been established for referral for the Wichita Sample:

	First Grade Sample	Kindergarten Sample
	Errors	Errors
Sept. 1959	5 or more phonemes	8-13 phonemes for C group 10-13 phonemes for E group
Sept. 1960	1) 4 or more phonemes (excluding [θ] and [ʒ])	1) 4 or more phonemes (excluding [θ] and [ʒ])
	2) consistent lisp	2) central lisp
	3) consistent [r]	3) central [r] problem
Sept. 1961	Consistent errors	1) 4 or more phonemes
		2) consistent lisp
		3) consistent [r]
Sept. 1962		1) consistent errors

Although a large number of children in one E school met the criteria for referral in 1959, the examiners decided not to list any of them for therapy. This group was scheduled to receive the program, and we thought the training would improve the level of speech performance.

In Table 27 the percentages of each sub-sample who received speech therapy are given. The Wichita kindergarten E sub-sample had fewer children than its C group enrolled in speech therapy during each of the three years. In addition, as a result of the final testing, more than twice as many children from the C sub-sample have been referred for therapy in September, 1962. The trend is similar for the Wichita first grade sample, but not so striking.

In Lawrence where the criteria for referral were not so stringent, approximately the same percentages in both the E and C sub-samples at both grade levels were enrolled in the speech correction program. Many children in Lawrence received therapy from university students who were in a supervised clinical practicum program. As a result any conclusions about therapy referrals for this sub-sample must consider the factors of less rigid criteria and the pre-professional clinical training of the clinicians.

The Teachers' Evaluation of the Speech Improvement Project

The eighteen kindergarten and first grade teachers who participated in the Speech Improvement Project evaluated the program. A questionnaire (Appendix F) was given to them during the first in-service training session, so that they would know what information would be needed at the end of the Project. Comments were requested about the following topics: 1) The approach to speech improvement and materials used; 2) Suggestions for modifications of the syllabus; 3) Benefits to the children; 4) Teacher preparation; 5) Over-all evaluation of the Project. The teachers were asked to keep weekly notes about the sections of the syllabus that were inappropriate, those that were effective, any unusual responses of the children to portions of the program, and any other observations that would be valuable to the Project Director in later modifications of the syllabus.

The syllabus was organized so that each of the thirteen sounds was presented in the same manner, though with different materials. All of the teachers reported that they were able to use the ideas in the form they were prepared and that the sequence of daily lessons for each week was helpful. Only one teacher indicated that the program was too structured. Fourteen of the eighteen said that there were sections of the syllabus that were more effective as learning experiences for the children than others. In general the objects, stories, and games seemed to stimulate most interest among the children. However, four of the ten kindergarten teachers reported that some of the stories were too long or too complex for their groups. Four of the eighteen teachers had difficulty holding the attention of the children when pictures were utilized in the lessons which stressed discrimination. Three teachers wanted more review sessions, but fifteen indicated there was a sufficient number. Although one of the eighteen felt that the final review session was confusing to the children, all the others reported favorably on all the review sessions. Ten rated the review sessions _excellent_, and eight evaluated them as _good_.

Many suggestions for modifying the syllabus were made by the teachers. All of them wanted more stories, and some recommended modifications in the current ones. Most of them said they would like to have more games. The majority felt that more sounds should be included in the new syllabus. They wanted new ideas for handling the picture materials used for sound discrimination. Most of the kindergarten teachers listed specific art and music activities which they had incorporated in their own programs.

Since this project was developed to help children within the framework of a total class, information about the benefits of such an approach to entire classes of kindergarten and first grade children were requested. Thirteen teachers reported that the speech production of the _majority_ of the children was aided, and five indicated that the speech of _all_ had benefited. All of the teachers agreed that the emphasis on sounds and speech did not discourage any of the children; and that the program enabled the majority of the children to develop more acceptable listening habits.

The teachers' preparation for this type of program was minimal. Only a few had had a basic course which introduced them to speech problems of children. However, sixteen indicated that their background in speech learning was sufficient to use the material effectively. On the other hand, one-half of the group thought that they needed more workshop or in-service training to prepare for this program. Evidently, most of them felt their general background was good, but that specific aspects of this particular approach to speech improvement required additional training.

The over-all evaluation of the program reflected the enthusiasm of the teachers for this type of speech approach. All recommended the continuation of the program. The following statements about the major benefits of such a program were given most frequently by the teachers:

1. Children become better listeners.
2. Children become more sound conscious.
3. Children develop a greater awareness of the need for better speech, utilize more adequate articulation and become better readers.
4. The program stimulated children to think about language as a tool to be used to communicate their feelings, ideas,

and experiences.

3. Closer and more adequate home-school relationships were fostered by the program.

Since all the teachers had volunteered to participate in this we may assume that they were all concerned about speech and language of children. They knew before they volunteered that this program would involve additional time for preparation and some in-service training which would be scheduled after school hours. They knew they would be required to modify their usual schedules, so that they would have time to present these materials daily.

The teacher evaluations of the program certainly could have been biased by their personal involvement in the program and by a desire to please the Director of the Project. However, neither they nor the Director knew theresults of the program when the evaluations were completed. Yet all but one of the eighteen were enthusiastic about the responses of the children, their development of an awareness of sounds, an interest and improvement in speech, and for the first graders a gain in reading skill. Several of the first grade teachers commented that the children were spelling words that their previous groups could not manage.

Perhaps a better test of the teachers' evaluation of this approach to speech learning has been the continuation of the program by these teachers with succeeding classes. Many of the teachers reported informally to the Director that they felt they spent the first year learning the syllabus, and becoming acquainted with the procedures for developing identification, discrimination, and production of sounds. They said that they were sure the children with whom they used the materials the second year were much more adept in listening and learning these speech skills than the experimental groups with which the Project was concerned.

Although the teachers' evaluations were subjective, they agree with one another and with many of the objective test measurements. The teachers reported that the children's speech had improved, and the statistical analysis of the picture articulation tests for both first grade and kindergarten groups immediately after the program and four months later substantiated their opinions. The first grade teachers were disappointed that the reading achievement test results were not more positive. However, the experimental group was always superior to the control sample, though not to a significant degree.

Several teachers who have had the children who had been enrolled in the Speech Improvement Project the previous year have commented favorably about the effectiveness of the program as a preparation for listening and reading activities. They have requested that the program be utilized with all the kindergarten children in their buildings.

In the opinion of these teachers who were presenting for the first time concepts that were new to them and utilizing structured plans prepared by a director who was not a primary teacher, this approach to speech improvement was a good one. They welcomed opportunities to exchange ideas with one another and with the Project Director. Their whole-hearted cooperation must be considered as one of the variables that contributed to the better speech of the children.

CHAPTER V

DISCUSSION

The principal question with which we were concerned was whether any special speech improvement program should be introduced in the kindergarten or first grade curriculum. The major rationale was the prevention of speech defects. We are all aware of the fact that practice makes permanent - and the child with a speech deviation is his own best reinforcement for maintenance of his defect. Other goals, such as greater improvement in reading and spelling, were also considered; but since the development of these latter skills is the primary responsibility of the classroom teacher, they were treated as potential secondary gains.

Speech

The Speech Battery included three tests which are similar to many currently in use by speech clinicians. The imitation test utilized words with two-and three-consonant blends, which are learned last by most children. The test of the sounds in isolation was discarded after the first year because the mean scores of the classes were so close to the maximum. The picture articulation test was given by the examiner without an auditory pattern that could be imitated by the child. Since it provided for evaluation of the phonemes in a situation that was comparable to conversation, we assumed that we were obtaining typical speech responses from the children. For many of the relationships that were evaluated, the picture test score was used.

Differences between the E and C groups at both grade levels on the Speech Battery were most striking at the end of the training and four months later. From that time however the larger numbers from the C sample who were enrolled in the speech correction program and the influence of the school curriculum cancelled out the effects of the program. Figures 1 and 2 provide an illustration of the trends for the three years for both grades.

Since articulation improves as children get older we should examine separately the data on the younger kindergarten, older kindergarten, and first grade sub-samples. At the termination of the program the E and C A.M. kindergarten groups were similar on all the speech tests. The E P.M. group however had consistently better articulation scores on the three tests than the C section. When these two groups were in first grade together the better articulation of the older K's was maintained, and in addition the speech of the younger K's improved or stabilized.

The differences between the E and C first grade sub-samples on the picture test were more significant than between the E and C P.M. kindergarten at the end of the program. We might say that the immediate effects on the first grade sub-samples were more prominent, but they levelled off also within the four-month period.

When we compared the picture articulation tests of seven kindergarten and first grade E groups when they had reached comparable grade levels, we found no differences between the sub-samples. Neither grade seemed to profit more than the other from the program.

FIRST GRADE SAMPLE

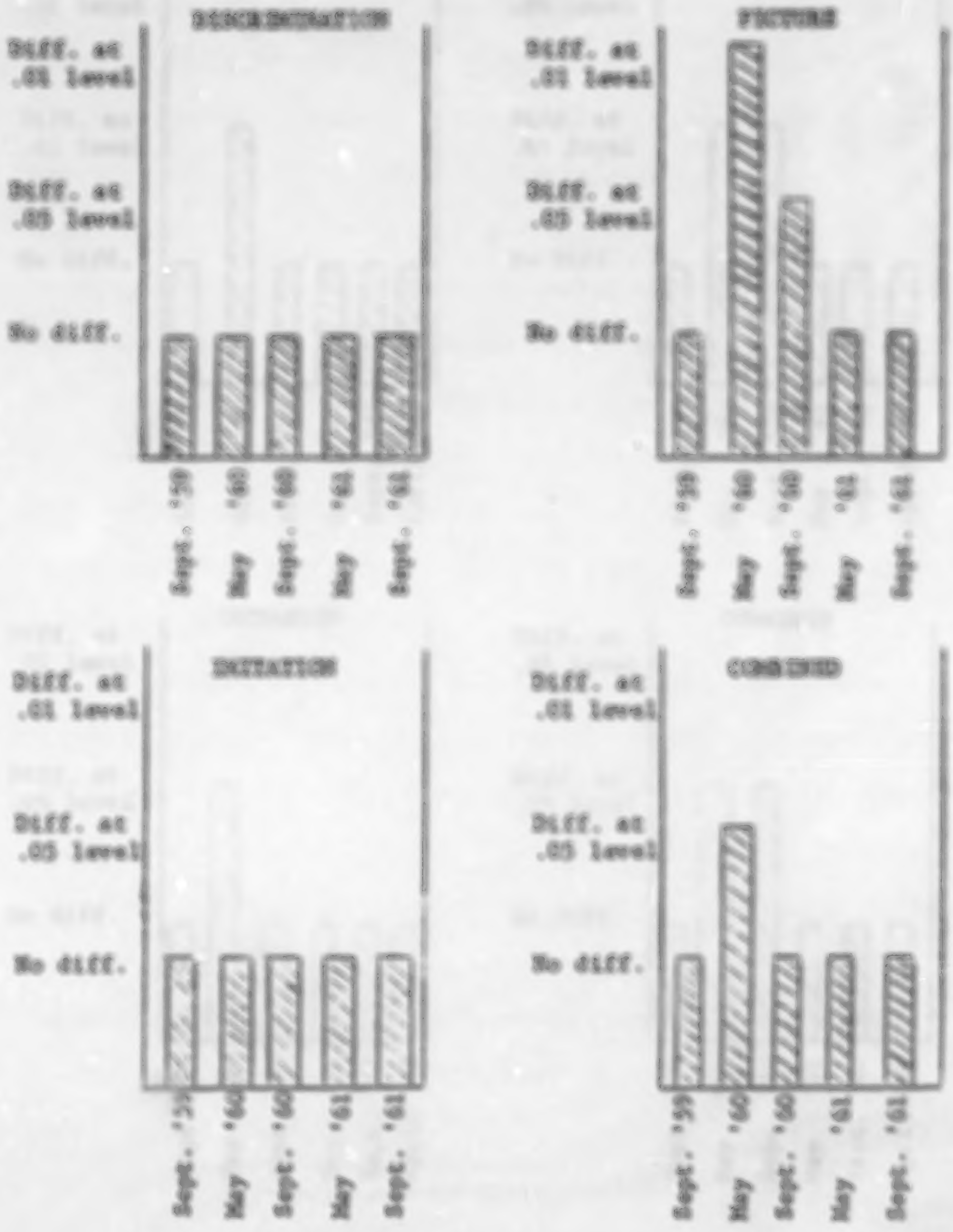

Figure 1. First Grade Trends

KINDERGARTEN SAMPLE

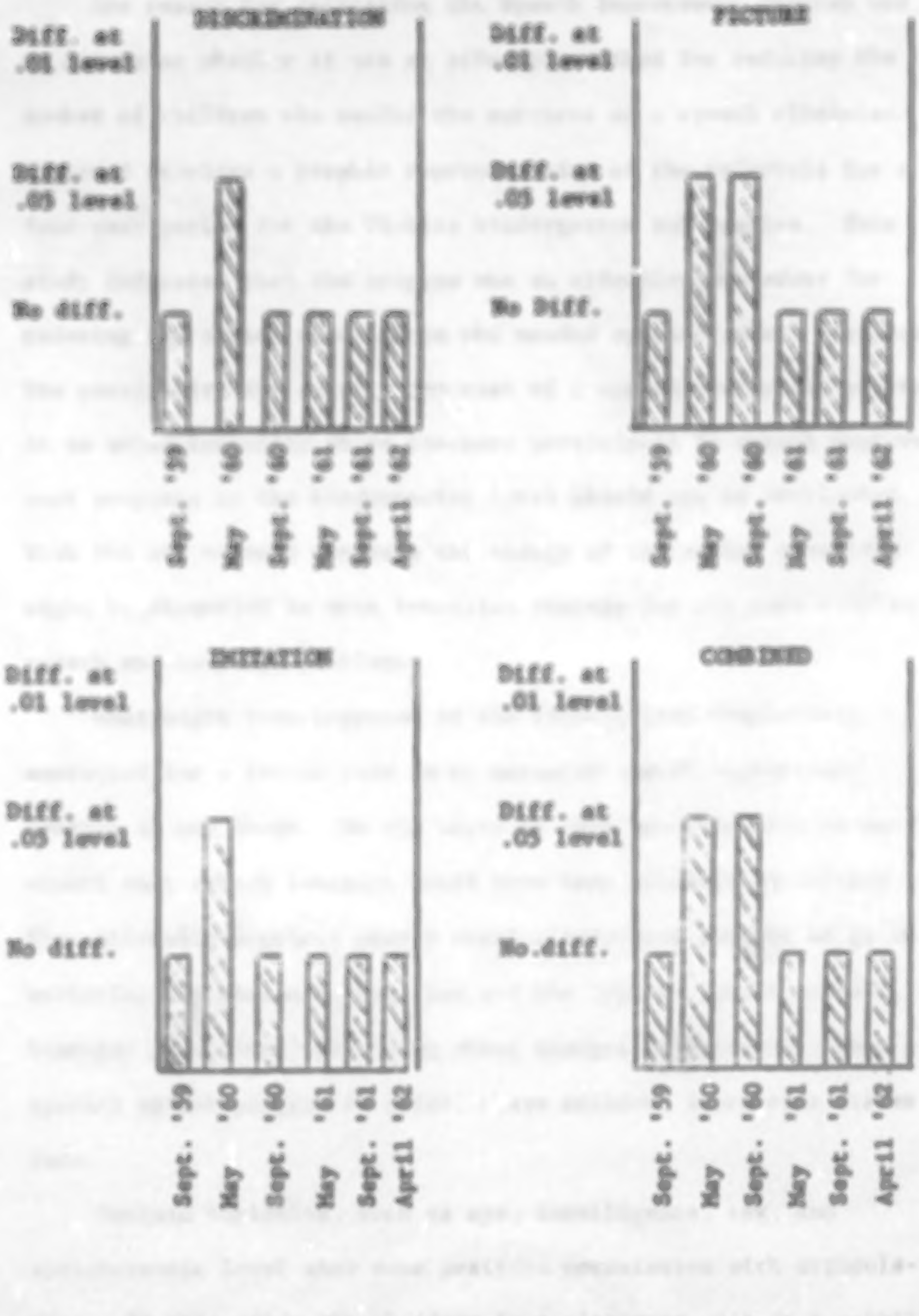

Figure 2. Kindergarten Trends. P.M. Sample Utilized for May, '60.

One reason for initiating the Speech Improvement Program was to determine whether it was an effective method for reducing the number of children who needed the services of a speech clinician. Figure 3 provides a graphic representation of the referrals for a four-year period for the Wichita kindergarten sub-samples. This study indicates that the program was an effective procedure for reducing the number of children who needed special speech services. The possibility for cutting the cost of a speech correction program in an urban community whose teachers participate in speech improvement programs at the kindergarten level should not be overlooked. With the aid of such programs the energy of the speech clinician might be channeled to more intensive therapy for the more complex speech and language problems.

What might have happened if the kindergarten sample were continued for a second year in an advanced speech improvement program is not known. On the basis of this study however we would expect that speech learning would have been accelerated further. The culturally deprived groups particularly have farther to go in mastering the phonemes, but time and the typical public school learning situations will bring about changes in patterns. When a special speech program is added, these children learn at a faster rate.

Certain variables, such as age, intelligence, sex, and socioeconomic level show some positive correlation with articulation. In this study the children in a classroom unit or a school

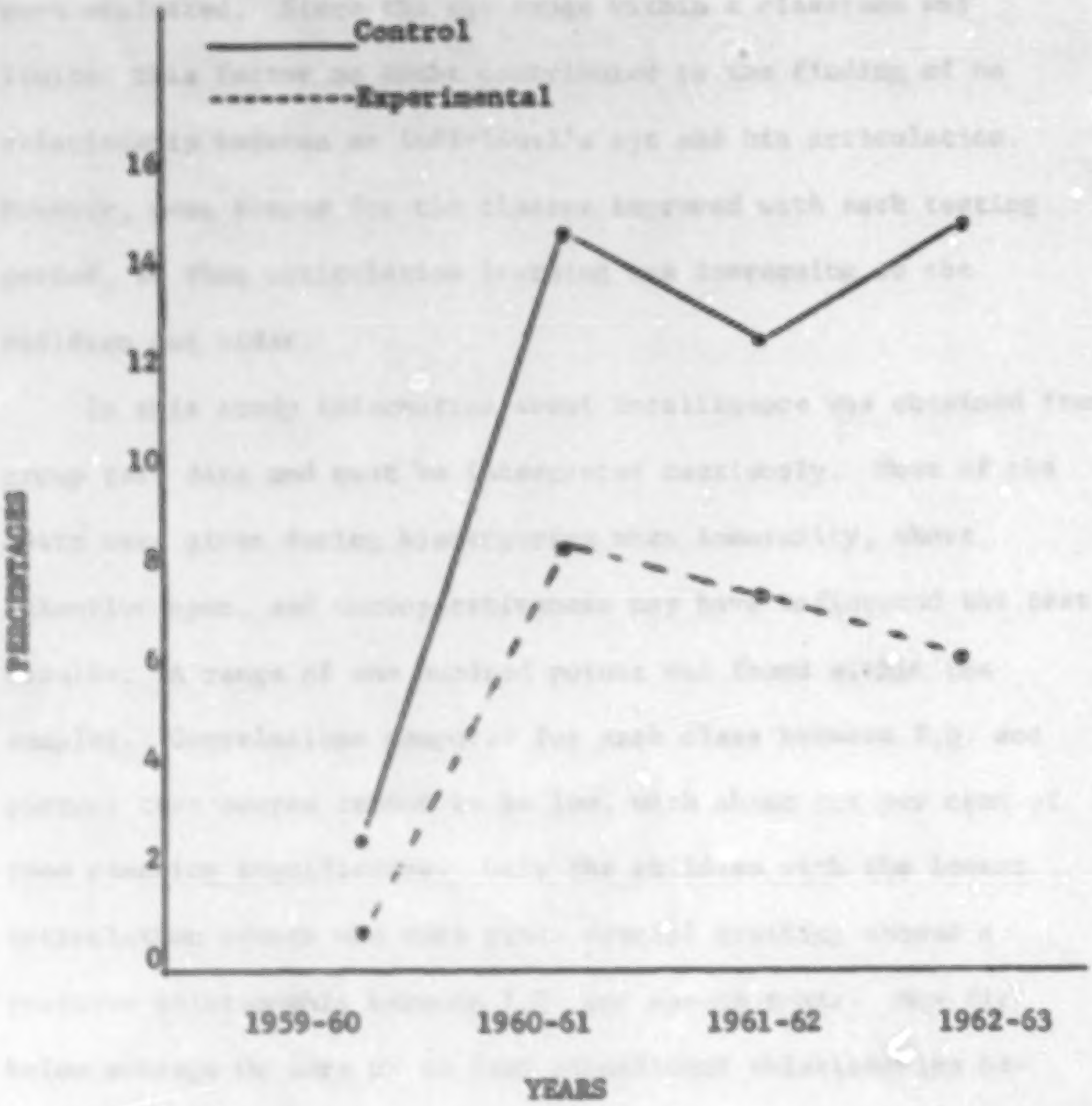

Figure 3. Percentages of Wichita Kindergarten Samples Enrolled in Speech Therapy

were evaluated. Since the age range within a classroom was limited this factor no doubt contributed to the finding of no relationship between an individual's age and his articulation. However, mean scores for the classes improved with each testing period, so that articulation learning was increasing as the children got older.

In this study information about intelligence was obtained from group test data and must be interpreted cautiously. Most of the tests were given during kindergarten when immaturity, short attention span, and uncooperativeness may have influenced the test results. A range of one hundred points was found within the samples. Correlations computed for each class between I.Q. and picture test scores tended to be low, with about ten per cent of them reaching significance. Only the children with the lowest articulation scores who were given special training showed a positive relationship between I.Q. and speech tests. How far below average we must go to find significant relationships between these two variables was not determined but at least we can say that most children enrolled in regular public school classes have sufficient intelligence to learn speech sounds.

Some differences in the speech performance of boys and girls were noted. At the older kindergarten and first grade level the boys who received the special training demonstrated better articulation than the boys who had no program. Within the C sample the P.M. girls had higher scores than the boys. Within the E groups at both grade levels boys and girls had similar picture test scores. The speech improvement program no doubt raised the articulatory proficiency of boys to a greater extent than it did for girls. Although Templin found that girls had significantly higher scores than boys at the seven-year level (16, p. 145) we found the difference at the time when the C sample was about six years of age. Perhaps changes in rate of articulation learning in the last fifteen years may account for this difference.[1]

The effect of the training on the speech performance of the socioeconomic levels was evaluated in two ways. Percentages of children who had perfect picture test scores were computed, but no attempt was made to use these percentages except for descriptive purposes. The high sub-group had the highest percentage, and the low sub-group the lowest. When class means were compared in a statistical design, no differences were noted at either grade level except for the sounds in isolation for the kindergartens. Within the low economic schools however there was a considerable range of mean picture scores - 28 to 36 - for a 40-item test. Such a range can be explained partially by the grossness of the socioeconomic classification. The schools in this study with the lowest scores were those with a predominantly Negro population.

[1] A master's thesis in progress by Mrs. Martha Stearns on "Age of Acquisition of Selected Consonant Sounds", using data from the Control Sample provides some justification for the assumption that children are acquiring phonemes at a younger age.

At the beginning of the third year of the study the Speech Battery scores of the schools, regardless of socioeconomic status, were so similar that this variable must be discounted except for those schools with almost 100 per cent Negro children. The improvement resulting from the school program has tended to cancel any initial differences. The cultural influences of ethnic groups however cannot be disregarded.

Discrimination

The Wepman Auditory Discrimination Test utilizes paired words which must be identified by the child as "same" or "not the same". The child receives no visual cues as the word pairs are given to him. In spite of the author's statements some of the words are not familiar to young children. Therefore, when the examiner presents words such as vie-thy, the difficulty may be due to word unfamiliarity, inability to comprehend the task, or to lack of auditory discrimination for small differences. As a result the test scores may not be indicators of auditory discrimination and should be interpreted with caution.

The results in this study were influenced to a great extent by the age, maturation, and cultural environment of the children. More than one-half of the kindergarten and one-fifth of the first grade children had invalid tests. As the children increased in age, the number of invalid tests decreased. Larger numbers of children in the low socioeconomic classes apparently did not comprehend the task. Those children who were enrolled in the speech improvement program were less likely to fail this test.

The training may have developed more adequate discrimination patterns in one of the two E samples. At the end of the speech program the kindergarten E group had lower error scores than the C section. At no other test period however did the performance of the two sub-samples differ. At the first grade level the E and C samples were always similar.

Reading Readiness, Reading, and Spelling

Reading Readiness. In order to interpret the data on reading readiness some understanding of the test that was given might be useful. The Lee-Clark Test measures primarily the accuracy of the child in using visual cues. It taps his ability to note similarities and differences in the letters of the alphabet, as well as in words. Only one section requires him to utilize audition - when he matches words, presented auditorily, with the visual picture.

Since the speech improvement program stressed listening for sounds but not looking at their visual symbols, we might hypothesize that the E sub-sample would not have higher scores on this test than the C group. We might further postulate that there would be no significant relationships between the reading readiness and picture articulation scores. The data support our first contention, but only to a limited degree our second one. The significant r's for five of the fourteen schools probably were influenced by several factors.

At the two schools where the articulation and reading readiness scores were the lowest, and at the three schools where the mean articulation scores have been among the highest, different factors probably were operating. The maturational level of the first two school groups was low, and maturity probably influenced both sets of scores. In addition one of these two schools had participated in the training program. Two of the other three schools were given the Speech Improvement Program, which may have contributed both to the higher articulation and reading readiness scores, with the result that those who performed well in articulation testing also did the best on the reading test. Perhaps the kindergarten teacher at the fifth school encouraged the development of pre-reading skills to a greater extent than the other kindergarten teachers, and may have been more concerned with the articulation patterns of the children in her classes.

These reasons, however, do not explain the fact that the other four E groups who received the program did not show significant correlations. In fact, correlations were negative for three of the four schools. The speech program may have improved articulation skills for most of these children, but since the program was auditorily oriented, there was no carry-over to reading readiness skills as measured by the Lee-Clark Test.

Reading. Reading achievement tests during the early elementary grades are designed to measure skills which are considered to be components of reading proficiency. The Metropolitan Primary Batteries, Primary Reading Profiles, and the SRA Reading Series for grades one and two emphasize areas such as word knowledge, word and letter discrimination, reading comprehension and spelling, even though the labels for the specific tests may be different. Greater emphasis is placed on vocabulary and reading comprehension in the achievement tests at the third grade level.

Although several different tests were utilized with the first grade and kindergarten samples, none of them were able to differentiate between the E and C classes, except for one sub-test. The Wichita first grade E sub-groups had significantly higher scores on the Word Recognition Section of the Metropolitan I Battery and the Lawrence first grade group on the Language Perception Unit of the SRA R 1-2.

Although the differences between the first grade E and C sub-samples were not large enough to reach a level of significance, mean scores of the E classes tended to be higher than the means of the C group during the three-year testing program. The trend was in favor of the group that had received the special instruction. In addition, we might say that the impact was most obvious immediately after the termination of the speech improvement program.

Since this program was not planned to influence reading skills, we would have been surprised if the training had rasied the performance of children who received it. The training did stress listening; and if listening habits were improved generally, we might expect that these children could take instructions more adequately. However, procedures for administering these tests provide for the inattentive child and therefore listening skills were not measured by the reading tests.

Spelling. Skills represented in high spelling achievement probably were not influenced by the type of training which was given to the E sub-sample. Although most of the first grade E classes performed at a level that was superior to the C group, the differences between the two samples were not significant. Correlations between the spelling and picture articulation test scores of the classes were not significant either. Although the stories used for the listening sessions were similar to the Tommy Stories developed by Zedler (22) the listening activity was not the only skill stressed in this program.

Teacher Evaluations

The classroom teachers who participated in the training were enthusiastic about the organization of the program and the benefits derived from it by most of the children in their classes. Though they had minimal training, they were able to utilize the prepared materials effectively.

The teacher is a very critical variable in such programs, since they require her cooperation and interest. It would be very difficult to determine whether the kindergarten or the first grade teachers in this study showed more empathy toward our goals. They were all capable teachers, willing to try new approaches to learning, and eager for new ideas.

The enthusiasm of the teachers carried over to the children.

In planning a program for 21 weeks we were fearful of the repetitive nature of the daily goals. Therefore we made an effort to provide colorful, attractive, meaningful materials. All of the children contributed to the class scrap book. Many of the kindergarten classes presented portions of the program for their parents. Their attention was high and was maintained throughout the program.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The purpose of the Speech Improvement Project has been to determine the influence of a specific approach to speech learning on articulation, discrimination, and reading skills. The program was carried out by kindergarten and first grade teachers who volunteered as participants. The experimental teachers were randomly selected from high, middle, and low socioeconomic schools; and within the same three levels control teachers were likewise designated. Of the 56 groups, which were intact classrooms, 40 were in the Wichita and 16 in the Lawrence, Kansas Public School Systems. Although the training was provided for only one year, the children were followed for a three-year period.

The experimental teachers who were given in-service training throughout the school year conducted a daily program in speech improvement for 21 weeks. A detailed syllabus had been prepared by the Project Director, and the materials to be used with it were provided. Visits by the Director were made to each class when the teacher was carrying out the program, in order to obtain first-hand information about both the teacher's and children's reactions. At the termination of the training each teacher was asked to evaluate specific aspects of the project.

Information for comparing the Experimental and Control sub-samples was obtained from tests administered either by the class-room teachers or by speech pathologists. The first grade sample in Wichita was given the Otis Mental Ability Test, Alpha Form, the reading sections of the Metropolitan Achievement Test Primary I and II Batteries, and the Iowa Test of Basic Skills. In Lawrence the SRA Achievement Series, R 1-2 and 2-4 were given. In Wichita the kindergarten classes were administered the Detroit Beginning First-Grade Intelligence Test, the Lee-Clark Reading Readiness Test, and the Primary Reading Profiles Test. I.Q. scores were taken from the school records; in Wichita they were based on the California Test of Mental Maturity, and in Lawrence, on the Lorge-Thorndike Intelligence Test. A Speech Battery and a test of auditory discrimination were given by selected speech pathologists at the beginning and end of each of the three years of the study.

Since the unit was the classroom, mean scores for each class for all tests were computed and utilized in the statistical treatment. Individual scores were used for correlations.

The analyses of the data support the following conclusions:

1. It is possible to prepare and carry out an effective program of speech improvement at either the kindergarten or first grade level.

2. Classroom teachers can be encouraged and trained to work in a speech improvement program under the supervision of the speech clinician.

3. Classroom teachers who participated in the program felt that the children made more progress in all aspects of the language arts program than their previous classes.

4. The first grade and older kindergarten E classes had significantly higher articulation scores at the end of the training and four months later than those that did not receive the program. In addition more children in the E groups had perfect articulation. By the end of the second year the E and C sub-samples were similar.

5. The experimental P.M. Kindergarten had significantly lower error scores on the discrimination test than the C's at the termination of training. Fewer children who received the program had invalid tests.

6. Articulation and discrimination of all sub-samples improved with age.

7. The main effects of the treatment on socioeconomic groups were noted at the kindergarten level for the tests of sounds in isolation and discrimination.

8. Age and intelligence were not significant variables in the articulation status of the classes in this study.

9. Boys at both grade levels seemed to benefit more than the girls from the treatment.

10. This approach to articulation learning at the kindergarten level reduced the number of speech problems which needed the special services of the clinician.

11. The secondary effects of the program on reading readiness, reading, and spelling skills were positive but not significant.

Many of the benefits of the program probably cannot be measured. The tests may not tap some of the skills that were stressed and developed. We hope that teachers' insight into and understanding of the speech learning of children has been increased, so that they may be more aware of speech difficulties and able to help the child with inconsistent articulation patterns. These effects cannot be evaluated except as they are noted by the teachers themselves and by their administrators who recognize the additional skills brought by the teachers to the future classes of children.

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APPENDIX A

ONE UNIT FROM THE SYLLABUS

p Sound - Mr. Pig

Lesson I. - Introduction

The p sound is presented first because it is easy for the children to visualize and is used correctly by most of them.

Materials

Mr. Frog, Listening Ears, Mr. Pig

Review

Mr. Frog is back with us again today. Who can tell me what speech helpers we use in talking? Who wants to show us these speech helpers on Mr. Frog? Does he have a voice box? Yes, but he doesn't talk with words as we do. Where are our speech helpers? (Have the children point to their jaws, teeth, lips, tongue, roof of the mouth, voice box, breathing machine.) Why did Mr. Frog give us Listening Ears? Shall we put them on now?

Activities

Our Sound Bag has a surprise for us. It's something that lives on a farm; it has a big nose; it's not a cow; it says oink, oink when it's hungry or happy. What is it? Yes, it's a pig. Mr. Pig's name begins with a p. Mr. Frog says p by putting his lips together. Let's hear all of you say p. Now let's have the girls do it, now the boys.

Some of you may have names that begin with p. Let's see. Who thinks his name begins with a p? (Have the children indicate whose names begin with p. If they can't get started, suggest some - like Patty, Paul, Perry, Peter, Priscilla, Pamela, Patricia, Peggy, Pearl, Polly.) Can any of you hear the p sound in your last names?

Some of you know colors that have the p sound in them. What are they? (Purple, pink.)

We have many things in this room with the p sound - things we see and use every day. Who knows some of them? (Paper, pictures, pencil, paint, pan, paste.)

Who can guess what I'm thinking of that has a p in it:

Something we eat for dessert (Pie)
Something we made for Halloween (Pumpkin)
The name of the meal we eat when we go home from school (Supper)
A coin (Penny)
The animal who came to visit us today (Pig)

Tomorrow we're going to have a story about Mr. Pig. We'll be putting Mr. Frog, Mr. Pig, and our Listening Ears in the Sound Bag until tomorrow.

Lesson II. - Listening

Review

Yesterday Mr. Frog introduced us to Mr. Pig. Today they are both ready to pass out the Listening Ears, so that we can have our story. You all know the story of the Three Pigs. We're going to act out the story today.

Activity

Our story needs some volunteers. We must have Mr. Wolf. Peter Pig, Pat Pig, and Paul Pig. Who wants to be Mr. Wolf? Peter Pig, Pat Pig, Paul Pig? The rest of you are going to be the three houses that the three pigs built. Let's have the rest of you count 1, 2, 3. Now, all the 1's will be with Paul and his straw house; the 2's will be with Pat and her wooden house; and the 3's will be with Peter and his stone house.

Before we start the story, we'd better practice what each one says:

Mr. Wolf goes: puff, puff, puff
Straw and wood houses: p, p, p
Stone House: pu, pu, pu

Are we all ready? Those who are the straw house form a circle; wooden house, another; and the stone house, a third circle. We'll stand up until Mr. Wolf blows down the houses. I'll help you to remember when you are to join in the story.

THREE LITTLE PIGS

Once upon a time there were three little pigs. Their names were Paul and Peter and Pat. They lived with Mama Pig and Papa Pig in Sleepy Valley.

One day Mamma Pig called to Paul and Peter and Pat. And this is what she said, "Papa Pig and I are getting old. We can't work hard enough now to feed you and buy your clothes."

So Paul and Peter and Pat Pig said good-by to Mama and Papa Pig and started down the path in front of their house. Soon they saw some straw in a field. Paul said, "Peter and Pat, I am going to stop here and build my house of straw." So Peter and Pat left him to build his house and they travelled on down the path.

Soon Peter and Pat saw some sticks beneath a tree. Pat said, "Peter, I am going to stop here and build my house of wood." So Peter left Pat to build her house. He travelled on down the path.

Finally Peter saw an old stone fence which was beginning to fall down. He stopped and thought to himself (for there wasn't anyone for him to talk to), "I'm going to stop here and build my house of stone." And he set to work.

Peter and Pat and Paul had their houses all built. Now there is someone else in this story. There is a Big Bad Wolf. The Big Bad Wolf just loved to eat little pigs for dinner -- or supper -- or even breakfast.

One day the Big Bad Wolf walked by Mama and Papa Pig's house. He didn't see Paul or Pat or Peter and he wondered where they were. So he walked on down the path. Soon he came to a field; all the straw was gone. Right in the middle of the field stood a house made of straw, a pig's house!

The Big Bad Wolf went up to the door of Paul Pig's house and knocked. He said, "Little Pig, Little Pig, let me in." But Paul Pig would not open the door. He just answered, "No by the hair of your chinny-chin-chin, I'll not let you in." So the Big Bad Wolf said, "I'll puff and I'll puff till I blow your house in." and he went, "P, p, p, p," getting weaker and weaker all the time. Paul Pig ran out the back door. The Wolf went "Puff, puff, puff, puff," again, and he blew the house in. Paul Pig ran to the house of his sister Pat Pig.

The Big Bad Wolf was very angry. He went tramping down the path. Soon he saw another Pig's house. He hurried up to the house and knocked. He said, "Little Pig, Little Pig, let me in." And Pat and Paul answered, "Not by the hair of your chinny-chin-chin, we'll not let you in." So the Big Bad Wolf said, "I'll puff and I'll puff till I blow your house in." And he went "Puff, puff, puff, puff." And as he blew, the wood house went "P, p, p, p," getting weaker and weaker all the time. Paul and Pat ran out the back door. The Wolf went "Puff, puff, puff, puff," again, and he blew the house in. Paul and Pat ran to the house of their brother Peter Pig.

Now the Big Bad Wolf was very, very angry because he had puffed and puffed and blown down two houses and he still didn't have any little pigs for supper. He went tramp-tramping down the path. Soon he saw another Pig's house. He hurried up to the house and knocked. He said, "Little Pig, Little Pig, let me in." and Peter and Pat and Paul answered, 'Not by the hair of your chinny-chin-chin, we'll not let you in." So the Big Bad Wolf said, "I'll puff and I'll puff till I blow your house in." And he went "Puff, puff, puff, puff." And as he blew, the strong stone house went "Pu, pu, pu, pu." And the Wolf blew again, "Puff, puff, puff, puff." He puffed so hard that he fell down the steps and broke two legs and his nose and ended up in the hospital. The Big Bad Wolf finally got out of the hospital, but he still has to walk on crutches, and now he goes, "Puff, puff, puff, puff," all the time instead of just when he is trying to blow down houses. And Peter, Paul, and Pat Pig aren't afraid of him anymore because now they can run faster than he can. And besides, they live together in the strong stone house that goes "Pu, pu, pu, pu."

Let's see if Mr. Frog can say p, p, p, before we put him away. Mr. Wolf, would you gather up the Listening Ears and put them in the Sound Bag for me? Tomorrow we'll have another surprise.

Lesson III. - Discrimination

Review

Who remembers the names of the three pigs in our story yesterday? What did the wolf say as he blew down the two houses? What did the houses say? What was different about Peter's house? As it stood up under Mr. Wolf's puffing, what did it say?

Materials

Mr. Frog, Mr. Pig, Listening Ears.
Pictures whose names will be used in the lesson.

Activities

We know that everything doesn't have the p sound in its name. Mr. Frog has brought along some pictures for us, and he wants us to tell him if these things have names with the p sound. Let's put on our listening ears, and as I show the pictures to you, you tell its name. If you think it has the p sound, then you tell me to put the picture in front of Mr. Pig. If it doesn't, you tell me to put it in front of Mr. Frog. We'll take turns. (If you prefer a child can distribute the pictures or each one can come up and draw one from the Sound Bag.

Pictures with p		Pictures without p	
cap	pencil	baby	bunny rabbit
cup	plane	ball	butter
lips	policeman	bear	fireman
paint	potatoes	bed	girl
pan	pumpkin	bird	hammer
paper	spoon	boat	meat
pear	top	boy	milk
penny		broom	

Let's count the pictures we gave to Mr. Pig and the ones we gave to Mr. Frog.

I know a rhyme that I think you will like. It goes like this:

Hippety Hop, Hippety Hop
Skip, Skip, Flip, Flop
Hippety Hop, Hippety Hop
Skip, skip, Now Stop.

We'll say it together. We'll form a circle, and we'll use actions with the poem. We'll hop as we do the first line; then we'll skip and move our bodies from side to side; and then we'll hop, then skip, then stop. All set?

Back to our seats! Leave your Listening Ears in the Sound Bag as you go. We'll need them tomorrow when Mr. Pig and Mr. Frog are back again.

Lesson IV. - Production

Review

Put on your Listening Ears! Mr. Frog and Mr. Pig want to see how well you hear and how well you remember. What did we do with the pictures yesterday?

Material

A toy boat or a picture of one.

Activity

I'm going to tell you the story of a boat, which goes putt-putt-putt. Can you do that - putt-putt-putt? You can help me tell the story by saying putt, putt, putt when I tell you.

On a fall afternoon a strange noise could be heard down by the river-putt, putt, putt. Far away a little boat could be seen. As it came closer, the putt, putt, putt became louder. The boys and girls standing by the river were so surprised to see such a little boat making such a loud putt, putt sound. The little boat puffed putt, putt, putt, much louder when he saw all the boys and girls. He was so proud of his putt, putt, putt, that he didn't notice a big log floating down the river. The putt, putt, putt became very loud. Then crash! The boat hit the log. All the boys and girls could only watch as the little boat went putt, putt, putt, putt, putt, blub, blub, as it sank to the bottom of the river.*

*Adapted from *The River Boat* in the p section of *My Speech Book*, Public Schools, Kansas City, Missouri.

How many of you have seen boats at the lake? On the river? Do any of your fathers have boats? We're going to pretend we're going to take a boat trip now, and we'll be thinking of things we'd like to take on our boat trip. We'll have to load it with supplies, and we'll have everyone tell us one thing he would like to put on the boat. I'll start by putting some milk on the boat. (Have each child use the phrase, "I'll put _______ on our boat."

We have so much on the boat it might sink! But it's fun getting ready for a boat trip.

Did anyone think of bringing popcorn for the boat trip? What would we need to pop corn? (a pan) Would you like to pretend that you are the little kernels that pop into popcorn? I'll say a little rhyme for you about popping corn, and you do the actions that go with it. All of you stand up now.

I'm a piece of popcorn.	
Put me in a pan.	(Children step forward and squat)
Shake me and Shake me	(They shake themselves)
As fast as you can	
And I'll pop!	(They pop up)

Tomorrow we'll bring something for Show and Tell. Till then we'll put the Listening Ears back in the Sound Bag.

Lesson V. - Sharing Time

Review

Are we ready to bring out our Sound Bag, with its Mr. Frog, Mr. Pig, and our Listening Ears? Who remembers what sound the little boat made on the river? What happened to the kernels of corn as we shook them?

Activity

As we show our things, wouldn't it be fun to begin by saying, "Mr. Pig and Mr. Frog, I brought _________." Mr. Pig will be leaving us for awhile after today.

(After sharing time is concluded, tell the children Mr. Frog has another surprise for them for the next day.)

Suggested Activities for this Week

1. Have the children draw a pig or color one. Have them tell about an experience they've had with pigs.

2. During music time sing the song Pop Goes the Weasel.

3. Begin the scrap book. Ask the children to bring pictures with the p sound in their names, and give them an opportunity to show their pictures to the class before they are pasted in the scrap book.

4. Read the story, Percy, Kelly and Pete, by Clare Newberry (Harpers).

5. Game for physical education:

"Piggy in the Pen." Children hold hands in a circle, with the "pig" in the center. "Pig" tries to escape as the children chant, "Pig is in the pen and he can't get out." He must not go over or under the locked hands, but has to break through them. When he does, the children cry, "Pig is out." He then picks a child to be the next pig.

APPENDIX B

GENERAL OUTLINE OF THE GOALS AND ACTIVITIES FOR EACH SOUND

I. Introducing the sound

  A. Association of the sound with the name of an animal and/or a familiar object

  B. Words in which we find it

    1. Identification of children whose names begin with the sound

    2. Objects or animals that make the sound

    3. Colors or numbers with the sound

II. Listening for the sound

  A. A story which stresses vocabulary that requires the sound

  B. Opportunities for the children to produce the sound in isolation

  C. Questions based on the story or other activities that require answers which utilize the sound

III. Discriminating between the new sound and other sounds

  A. Picture materials which require children to determine whether or not the new sound is present in specific words

IV. Producing the correct sound in words

  A. Action Games

  B. Stories

  C. Activities

V. **Sharing time - carry-over of correct sound production in Show and Tell Time**

   A. **Utilization by the children of a key phrase which includes the sound being stressed**

Incorporation of the sound in other classroom activities

In art work

In physical education

In number work

In music

In reading activities

APPENDIX C

ORDER OF PRESENTATION OF MATERIALS

Weeks		Central Theme	Identifying Object
November	2	Sounds around us	Mr. Sound Man
	9	p sound	Pig
	16	k sound	Captain Kangaroo
	23	s sound	Timmy Teakettle
December	7	z sound	Buzzing Bee
	14	Review of p, k, s, z	
January	4	g sound	Grey Goose
	11	sh sound	Seashell
	18	l sound	Telephone
	25	f sound	Funny Face
February	1	Review of g, sh, l, f	
	8	v sound	Valentine
	15	ch sound	Choo-choo-Train
	22	j sound	Jack-in-the-Box
	29	r sound	Rooster
March	7	Review of v, ch, j, r	
	14	voiced th sound	Airplane
	21	unvoiced th sound	Thumper
April	4	Review of entire program	

APPENDIX D

MATERIALS TO BE USED WITH THE SYLLABUS

First Unit

The Frog

Mr. Sound Man

Listening Ears

Records: Muffin in the City and Muffin in the Country

Mirrors

Talking Time Filmstrip Series 1,

"Our Talking Helpers" (Webster Publishing Company)

Second through Nineteenth Unit

The Frog, Mr. Sound Man, Listening Ears, Sound Bag

Mirrors

Paper model of a tongue

What They Say Cards (Webster Publishing Co.)

Speech Improvement Cards by Bryngelson, Glasby; Scott, Foresman and Co.

Selected film strips

Additional pictures and objects

A class scrap book

Crayons

APPENDIX E

DIRECTIONS FOR USING THE SYLLABUS

Time

The daily lessons take 15-30 minutes. The teachers who used the material in the experiment found that for both kindergarten and first grades, the attention of the children was held for the most part for 20-30 minutes. If the teacher wishes to expand these materials and/or to add others that complement the lesson, she should feel free to do so. The related activities can be scheduled as frequently as the teacher is able to work them into her program. Some of the kindergarten teachers utilized the syllabus as a core curriculum.

General Suggestions

In order for the teacher to present the lessons as effectively as possible, she should be very familiar with the materials. She will want to preview the filmstrips and records so that she knows how to present them to her group. The pictures will have to be selected and the objects readily available.

Throughout the program, stress the sound which is being presented. Over-emphasize it in the initial presentation, in the story materials, and the section on discrimination. Always refer to the sound, not to the letter of the alphabet. For instance, it's the k sound not the kay sound. This approach will make it easier for children later when they learn in reading that the k sound has several spellings.

Because the child's failure to develop normal speech patterns may be due to many causes, there may be some children in the group who make little progress. Do the best that you can with these children, but remember you are not expected to be speech clinicians. You may want to talk with the speech clinician about such children. Within the limits of this material and your own training, you will help those children to use the group experiences to their best advantage. We encourage you to single out children for sections of the program, but remember to do so in moderation. None of us want a child to feel defeated because he can't seem to do what his teacher expects of him.

We suggest that the class develop a scrap book, with the children bringing in pictures which they have found with the sound that is being stressed. The assignment to find pictures should be introduced after the children have identified the sound and listened for it.

Introduction of the program

In order to encourage the children to remember the purpose of these activities, a few items have been suggested for use each day.

Begin each lesson with Mr. Frog, Mr. Sound Man, and the Listening Ears. Mr. Frog introduces each new sound, and the listening ears help the children to learn about the sounds. Children can take turns distributing the imaginary ears, and also in bringing out the frog and returning him to his place. Mr. Sound Man and his bag can be especially useful in those sessions where objects and pictures are used. Since new materials will be utilized each day the re-appearance of these familiar objects will add continuity to the program, and will help the children to tie the program into a meaningful part of the year's activities. At least, the teachers who used the syllabus for the first time found these daily reminders were very useful.

First Unit - Sounds Around Us

The first unit emphasizes the development of good listening habits. The children should be encouraged to listen for gross environmental noises and to discriminate among the more discreet sounds of people's voices and pitch patterns. Although you may spend only a week or two on these activities, all of the succeeding lessons stress the skill of listening and its role in enabling children to make finer and finer discriminations among the sounds we use in talking.

Also, during this unit we identify the parts of the body which are used in talking - the lips, jaw, tongue, teeth, and roof of the mouth. We hope that this information also will be used, but very discreetly, throughout the program. We do not wish the children to be so conscious of tongue placement, for instance, that they forget to listen, to look, and to feel.

Units 2, 3, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15, 17, 18: Special Sounds

Activities of these units are developed for specific sounds.

Each unit has the general goal of helping the children to identify one sound, to listen, to discriminate between it and other sounds, and to produce it correctly in controlled situations. In addition activities have been recommended which should encourage the children to engage in successful speaking experiences. The materials can be presented in a sequence such as the following daily schedule. For some sounds, however, you may want to spend two days on one aspect of the sound. Sufficient ideas have been presented so that you can concentrate longer on those aspects of learning the sound that seem to be most pertinent for your class.

First Day: Identification of the sound

After the children have put on their imaginary Listening Ears, Mr. Frog and Mr. Sound Man introduce the new sound through the association of the sound with an animal, an object, or a popular figure. For instance, the p sound is associated with the pig, which may be taken from the Sound Bag. Then, the children are asked to think of various categories of names which have the p sound in them. At this stage we want the children to be thinking about the words in which they use the sound. This type of silent internalization of the way that words sound requires the use of judgement on their part to accept some words and reject others. Also, in this lesson we want the children to get, wherever possible, a visual picture of how they make the sound, and how the teacher and their peers make it. No lengthy discussion is needed. The very simple directions, plus the use of the mirror, will enable them to see the position of the articulators as they produce the sound alone, and in combination with other sounds. We would also like each child to get the kinaesthetic sensation of how it feels as he makes the sounds of our language. He can feel the tongue as it rests momentarily on the back portion of the roof of the mouth as he says a k sound.

Now that we have identified the sound for the children in as many ways as we can, we ask them to remember what they have learned till the next day when another skill will be added.

Second Day - Listening for the Sound

Mr. Frog again helps to distribute the Listening Ears. He is interested in knowing whether the children remember what sound they are stressing, who makes the sound, and whether he can hear them make it in unison, in small groups, and in some cases individually.

Then the teacher asks the children to listen carefully to the story she will tell them. In some instances she'll be using a book, and will want the children to tell her the names of some of the pictures before she starts her story. Also, in many of the stories the children use the sound in isolation at stated places as a response. While she tells the story, the teacher is to emphasize the key words (those which contain the sound being stressed and carry the main thread of the story).

After the story has been told or read, discussion of it may center around the experiences the children have had which relate to the story; they may be asked questions about the story, which they are encouraged to answer in complete sentences; or they may recreate portions of the tale. Whatever the activity may be, keep in mind that our goal here is not only general listening and remembering of the story, but also that special words in this story have the sound on which we're working. Lots of other words of course don't have the special sound. We don't want the children to be so carried away by the story and its activities that they forget its importance as a tool in developing discrete listening habits.

Third Day - Discriminating between the new sound and other sounds

After the Listening Ears are on and Mr. Frog has been taken from the Sound Bag, he helps again to remind the class that his companion for the day, whether it's the Pig, or the Grey Goose, has some new activities to introduce. The children again identify the key object and make "his" sound.

At this point we are ready to ask the children to make judgements about whether names of pictures do or do not contain the special sound. This type of activity requires that children recognize the sound auditorily, although they may not produce it correctly. This session utilizes pictures of objects primarily. Some pictures have the special sound in their names, but others do not. The children are asked to place the picture in front of the key object if it has the special sound; and to give it to Mr. Frog if it doesn't. As the year's program progresses, and the children learn to carry out this activity successfully, the teacher may want to ask about the names of pictures that have the sounds which were covered in earlier sessions.

Because this process of learning to discriminate is difficult for some children, additional motivation may be introduced by assigning leaders for each week, who can then select the children to whom the pictures are to be given to be named. Or the procedures for naming the pictures can be varied from one sound to another. One teacher had the children place the pictures without the special sound on a train that was on an imaginary siding, because those pictures would have to wait until a later day for their trip.

After the pictures have been classified as those with, and those without, the sound, the teacher may want to place several of them on a flannel board or holder, and ask specific children to name a picture and tell whether it has the special sound. She may want to repeat the names of some of the children, for further learning in discrimination.

This session ends with the re-assurance that new activities will be introduced at the next session.

Fourth Day - Producing the Correct Sound

After the Frog, the Listening Ears, the Sound Man, and the identifying article for the week's sound have been set out, the children may be asked to describe what activity had been stressed the previous day. They may also be asked individually or as a class to produce the special sound in isolation.

The purpose of this day's activities is the utilization of the correct production of the special sound in controlled situations. Many different types of activities are suggested for this day's program. Sometimes, a rhyme is used, or the children may play grocery store or some other game in which they use carrier phrases.

When a child is unable to produce correctly the sound for that unit, after he has identified it, listened to it, and discriminated between it and other sounds, the teacher should observe what he says in place of the correct sound and what he does with the articulators. For instance, as he says the word, *shoe*, does he say *sue* or *thu*? Does he spread his lips, instead of rounding them for the *sh*; or does he protrude his tongue and therefore substitute a *th*? Over-emphasize the correct production for him, ask him to imitate you as you say it in isolation, and then ask him to try to put the correct sound in the word, like this - *sh* - *oe*, then *shoe*. Place the emphasis on the positive approach; and whereever possible, let the experience be a successful one. Even partial success is better than complete failure. Try this procedure once or twice and then drop it for a time. You might have the entire class, or one child carry out the procedure correctly, as another ear-training device.

Fifth Day - *Carry-over of correct production in Sharing Time*

Using the key objects, such as Mr. Frog as motivational devices, structure *Sharing Time* so that the children will utilize the suggested carrier phrase or phrases as they describe what they have brought to school. If time permits, the teacher may select a few of the articles brought by the children for additional class practice in the correct production of the special sound. If you do not have a *Sharing Time*, plan to use the carrier phrases in whatever activity provides speaking activities for the children. If you spend some time each day in *sharing*, rather than on any preselected day, arrange for each child to use a carrier phrase that seems pertinent for the child and will provide practice on a specific sound.

Units 6, 11, 16, 19 - Review Sessions

During certain weeks review sessions will be held. Since we want the learning of speech sounds to be cumulative, we thought that review should be given during specific periods. During the final week all of the sounds covered in the program will be reviewed.

The program for these weeks will be slightly different from the initial presentation of the sounds. The basic goals of identification, discrimination, and correct production of the sounds however will be stressed again. Many of the materials such as Mr. Frog and Listening Ears used in the preceding weeks will be utilized.

On the *first* day of the review week the four sounds will be associated with their identifying items. Encourage the children to use visual, auditory, and kinaesthetic cues to identify each sound. Production of the sound in isolation will be a part of the activities.

The second day's activities will stress discrimination. During the weeks when voiced and voiceless pairs are reviewed, such as s and z, the differences between the two sounds will be brought out. Also, words will be introduced which contain two of the four sounds in the review unit. The teacher will over-emphasize the sounds during this period, also.

On the third day the program will combine discrimination and production of the sounds. At this point we suggest that the teacher should not over-emphasize the sound patterns.

On both the fourth and fifth days emphasis will be placed on correct production of the four sounds in words and carrier phrases. Sharing Time will provide opportunities for the children to practice the sounds, and to stabilize normal production in conversation.

Incorporation of the sound in other classroom activities

At the end of the lessons on each sound some suggestions are given for helping the children to be aware of the speech program in many of the activities in which they engage. The following ideas can be applied to each sound. Some classes may try to draw or color the identifying items. The best ones, or all of them, could be posted around the room, or on the bulletin boards in the hall. Some classes have displayed their materials in the school's cabinets. Many physical education activities can be adapted, so that the class can imitate the walk of the animals, or play games which utilize the special sound. In music the children learn to identify high and low notes and different musical instruments, a skill which requires a kind of discrimination. Stories can be selected by the teachers which use key words that require the sound which is being learned. Many teachers will think of countless ways to modify the curriculum, so that it is intertwined with each day's speech program.

No attempt has been made to give specific ways that the first grade teacher can incorporate the visual learning of the letters of the alphabet with the auditory presentation. Since reading is developed in many ways by different teachers it seemed best to encourage each one to work out her own related activities. She might for instance want to point out to the children that the name of the child in the reader begins with the sound they have called the Teakettle sound, or the Jack-in-the-Box sound. During word building activities she might wish to utilize the vocabulary of the speech improvement program.

APPENDIX F

EVALUATION QUESTIONNAIRE FOR THE TEACHERS

1. Could you use the ideas in the form they were presented? Yes___ No___

2. Was the program too structured? Yes___ No___

3. Was the sequence of lessons for each week helpful___not helpful___

4. Were there specific sections of the syllabus that you felt were more effective as learning experiences for the children than others? Yes___ No___

5. Which types of materials stimulated most interest among the children?

   1.

   2.

   3.

   4.

   5.

6. Which types of materials did not hold the attention of the children?

   1.

   2.

   3.

   4.

   5.

7. Review sessions

   1. Frequency: too many___ too few___ adequate___

   2. Confusing to the children: Yes___ No___

   3. Excellent ___ Good___ Fair___ Poor___

8. With what other aspect of the curricula did you find it relatively easy to integrate the speech program?

1.

2.

3.

9. For how many of the children did the speech production improve during the program?

None of them ________

A few ________

The majority ________

All of them ________

10. Did the emphasis on sounds and speech discourage any of the children? Yes____ No____

11. Did the program enable the majority of the children to develop more acceptable listening habits? Yes____ No____

12. Indicate the children whom you think benefited most using overall speech development as your criterion:

1.

2.

3.

4.

5.

13. Indicate the children whom you think benefited least, using overall speech development as your criterion:

1.

2.

3.

4.

5.

14. Do you think your background in speech learning was sufficient for you to use these materials effectively? Yes____ No____

15. Do you think you needed more workshop time to prepare for this program? Yes____ No____

16. Would you recommend the continuation of a speech improvement program? Yes____ No____

17. If the answer to 16 is yes, what specific benefits do you think such a program has for children?

18. If the answer to 16 is yes, how would you improve the syllabus?

19. If the answer to 16 is no, would you indicate the reasons for your answer.

APPENDIX G

INSTRUCTIONS FOR ADMINISTERING THE SPEECH TESTS

The test is divided into four parts: 1) The Wepman Auditory Discrimination Test; 2) a Picture Articulation Test; 3) Sounds in Isolation Test; 4) an Imitation Test. All children will be given Tests 1, 2, and 4; and only those children with errors on the Picture Test will be given Test 3.

1) Wepman Auditory Discrimination Test - All children will be given Form I of this test in September, and Form II the following May. Directions for administration of the test provided in Wepman's Manual have been modified for this study. Preliminary work with this test has indicated that many five-year-old children do not know the word different. Also, we found that we could teach the discrimination task to some children if we spent sufficient time on it. To minimize the effects of teaching, therefore, we shall limit our examples to five. Instead of the classification of same and different we shall use the terms same and not the same. Also, a maximum of five examples of these categories shall be given to each child. The following pretest word-pairs are to be presented by the examiner:

boy - girl

girl - girl

man - pan

sue - shoe

hat - cat

2) Picture Articulation Test - The cards will be shuffled and presented in random order for the child to name. No stimulation should be given to him. If he cannot name the picture after the examiner has asked some leading questions to elicit the correct response, he will be given a no response score. Use the following system for marking the test responses:

a. Correct response - leave square blank

b. Incorrect response -

1. Omission - 0
2. Distortion - D
3. Substitution - write in the substitution

c. No response - NR

3) Sounds in Isolation Test - If a child misses any of the thirteen sounds of the Picture Articulation Test, ask him to imitate your production of that sound in isolation. Present the sound once, and ask him to imitate you. Give him three trials. If he produces the sound correctly after trial 1, place a check mark (✓) and a 1 in the correct square. If he requires 2 or 3 trials, but produces it correctly, place the number of trials in the frame of the ✓ mark. If he fails the task after three trials, place an X in the appropriate square.

4) Imitation Test - the four cards which have five words on them, will be shuffled, and the words will be presented in random order for the child to imitate. The following instructions should be given to the child: "We're going to play the game of Follow the Leader. Whatever I say, you say. Watch and listen closely now....". If the child makes an error on the blend, place an X in the appropriate square. If the blend is correct, leave the square blank. Do not overemphasize the blends being tested.

Order of presentation of Tests 1, 2, and 4:

Randomize the order of presentation. In each class one-third of the children should be given Test I first; to another one-third, Test 2 will be presented first; and Test 4 will be given to the other third. Follow the same procedure for the presentation of the second and third tests.

Indicate on the child's scoring sheet the order of presentation of Tests 1, 2, and 4.

APPENDIX H

SCORING FORM FOR SPEECH TESTS

Name______________________ Birthdate_____________ Date____________

School__________________________ Enroll in Speech Therapy: Yes___ No___

Sound	Test 2 (Picture Stimulation Test)	I	M	F	Test 3 (Sounds In Isolation)
k	cat, chicken, book				
g	girl, wagon, pig				
f	fork, elephant, or telephone, knife				
v	vacuum or valentine; television, stove				
ð	the, this or that; feather; mother or brother				
ʃ	shoe, washing, fish				
t	chair, teacher, watch				
l	light or lamp, balloon, ball				
r	rabbit, farm or barn, car				
dʒ	jumping, orange juice, or angel, orange				
s	sun, pencil, bus				
z	zipper or zebra, scissors, nose				
θ	thumb, toothbrush, teeth, mouth				

Test 4
(Imitation Test)

	1	2	3	4	5
1. Shrink, sleep, stairs, sweep, scratch					
2. Gasp, biggest, rhubarb, iceberg, earth					
3. Elephant, conduct, whisker, burst, church					
4. Please, three, spread, aster, caged					

APPENDIX I

Treatments by Subjects Design

Source	N	d.f.
Treatments	-2	1
Subjects - N varied depending upon whether or not all school means on a specific test for the Kindergarten or First Grade Samples were utilized. The df were N-1.		
Treatments X Subjects	(2 X N)	1 X (N-1)
Total		2N-1

Treatments by Levels Design

Treatments	-2	1
Levels	-3	2
Cells	-6	5
Treatments X Levels	-6	3
Within-Subgroups	N	N-6
(N varied with the number of school means on a specific test for the Kindergarten or First Grade Samples)		
Total		N-1

APPENDIX J

Table 1. Size of Sample for Each Period of Speech Testing

	First Grade			Kindergarten		
Period	E	C	Total	E	C	Total[a]
September, 1959	180	165	345	493	528	1021
May, 1960	167	153	320	418	450	868
September, 1960	135	125	260	315	319	634
May, 1961	130	120	250	288	289	577
September, 1961	118	109	227	252	251	503
April, 1962				244	229	453

[a] The drop in N between September, 1959, and May, 1960, was due to the splitting of large kindergarten groups. Re-assignment occurred however before the initiation of the Speech Improvement Program. The additional loss between May and September, 1960, was the result of the large numbers who transferred to parochial schools.

Table 2. Education of Parents of Children in the Experimental and Control Sub-Samples

Highest Level of Education	Percentages Fathers		Mothers	
	First Grade			
	E N=156	C N=148	E N=163	C N=149
Elementary	.6	.0	.0	.6
Junior High	4.4	3.4	4.9	3.4
High School	38.4	40.5	49.7	47.0
College	46.1	48.6	44.2	48.3
Post-Graduate	10.3	7.4	1.3	.6
	Kindergarten			
	N=372	N=397	N=392	N=431
Elementary	3.2	3.0	2.3	3.7
Junior High	12.4	13.6	8.7	12.9
High School	30.9	40.1	48.2	51.7
College	40.3	33.8	40.3	30.2
Post-Graduate	13.2	9.6	.7	1.4

Table 3. F^a Values for C.A., M.A., and I.Q. Group Means of Experimental and Control Sub-Samples

Item and Sub-Sample		F	p
C.A.[b]	First Grade	1.73	N.S.
C.A.	Kindergarten	.45	N.S.
M.A.[c]	First Grade (Wichita)	.80	N.S.
M.A.	Kindergarten (Wichita)	.26	N.S.
I.Q.[d]	First Grade (Wichita)	.05	N.S.
I.Q.	Kindergarten (Wichita)	.02	N.S.
I.Q.[e]	First Grade & Kindergarten (Lawrence)	3.74	N.S.

[a] Lindquist's Treatments by Subjects Design; $F_{.05}$ for 1, 9 d.f.=5.12

[b] C.A. at time of first posttest, May, 1960

[c] M.A. for first grade was based on Otis Quick-Scoring Mental Ability Test, Alpha Form; and for Kindergarten on Detroit Beginning First Grade Intelligence Test (Revised)

[d] I.Q.'s for all Wichita children were based on the California Test of Mental Maturity

[e] I.Q.'s for all Lawrence children were based on the Lorge-Thorndike Intelligence Test

Table 4. Range of Class Means for C.A., M.A., and I.Q.

Item	First Grade	Kindergarten
C.A.	6.70 - 7.01	5.20 - 6.23
M.A. (V)	7.30 - 9.48	6.01 - 8.21
I.Q. (V)	95.80 - 120.09	94.61 - 118.75
I.Q. (L)	112.40 - 118.65	103.40 - 122.73

Table 5. F-Values[a] for Speech Scores of Experimental and Control First Grade Sub-Samples

Period	Picture	Isolated Sounds	Imitation	Combined
Sept. 1959	.01	.49	.13	
May 1960	12.25**	1.47	4.51	9.80*
Sept. 1960	8.47*		1.14	3.73
May 1961	.01		.06	.04
Sept. 1961	1.79		3.90	3.48

*Significant at .05 level. $F_{.05}$ for 1, 7 = 5.59

**Significant at .01 level. $F_{.01}$ for 1, 7 = 12.25

[a] Lindquist's Treatments by Subjects Design

Table 6. Percentages of Perfect Picture Articulation Test Scores in First Grade Sub-Samples

Socio-economic Levels	Percentage				
	Sept.'59	May'60	Sept.'60	May'61	Sept.'61
			Control		
High	33.3	35.5	35.6	42.3	76.9
Middle	30.3	38.2	35.4	65.4	72.9
Low	25.9	40.0	56.3	56.3	58.5
Total	31.5	37.9	42.4	60.9	69.7
			Experimental		
High	28.9	71.1	74.4	86.5	81.5
Middle	35.2	63.6	55.2	62.7	60.6
Low	32.2	43.5	55.0	55.6	64.3
Total	31.7	62.9	60.7	66.0	67.8

Table 7. F-Values[a] for Auditory Discrimination Scores of Experimental and Control First Grade and Kindergarten Sub-Samples

Period	F First Grade	F Kindergarten
Sept., 1959	.09	.39
May, 1960	2.80	6.49*
Sept., 1960	.45	1.88
May, 1961	.001	3.57
Sept., 1961	.04	2.65
April, 1962		2.10

*Significant at .05 level. $F_{.05}$ for 1, 9 d.f. = 5.12; $F_{.05}$ for 1, 19 d.f. = 4.38

[a] Lindquist's Treatments by Subjects Design

Table 8. Percentages of Invalid Auditory Discrimination Tests in First Grade Sub-Samples

Socio-economic Level	Sept.'59	May'60	Sept.'60	May'61	Sept.'61
			Control		
High	16.6	3.2	3.8	3.8	0
Middle	24.5	6.8	7.3	1.3	0
Low	4.1	5.0	6.3	.0	0
Total	20.1	5.8	6.4	1.6	0
			Experimental		
High	12.8	4.4	.0	2.7	0
Middle	22.3	3.3	1.3	1.3	0
Low	7.4	4.3	5.0	.0	0
Total	17.7	3.6	1.5	1.5	0

Table 9. Main Effects of Training on Speech and Discrimination Scores[a] of First Grade and Kindergarten Sub-Groups of Economic Levels[b]

	F	
Test	First Grade	Kindergarten
Discrimination	9.30*	4.19*
Picture	4.18	1.30
Isolated Sounds	.34	5.90*
Imitation	3.29	3.65

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*Significant at .05 level. $F_{.05}$ for 1, 10 d.f. = 4.96; $F_{.05}$ for 1, 34 d.f. = 4.13

[a] [illegible]

[b] Lindquist's Treatments by Levels Design

Table 10. t-tests for Mean Differences on Discrimination and Isolated Sounds Tests Within and Between Socioeconomic Levels

Group Comparison	First Grade Discrim.	Kindergarten Discrim.	Kindergarten I.S.
Level I^{a}, E. and C. Sample	3.54**	1.91	.04
Level II, E. and C. Sample	2.73**	.35	3.23**
Level III, E. and C. Sample	2.36*	1.89	1.35
Levels I & II, C. Sample	.73	.96	1.38
Levels I & III, C. Sample	2.20*	4.07**	1.61
Levels II & III, C. Sample	2.32*	3.56**	.37
Levels I & II, E. Sample	1.78	2.61**	1.25
Levels I & III, E. Sample	3.68**	4.18**	6.00**
Levels II & III, E. Sample	2.61*	1.90	1.60

*Significant at .05 level

**Significant at .01 level

^{a}Level I = High, Level II = Middle, Level III = Low

Table 11. Pearson *r*-Values for the Correlation of C.A. and Picture Test Scores[a] for Experimental and Control Sub-Samples

	Control					Experimental			
	AM		PM			AM		PM	
School	*N*	*r*	*N*	*r*	School	*N*	*r*	*N*	*r*
				Kindergarten					
1	19	.279	24	-.185	1	15	.066	18	.222
2	22	.218	25	.013	2	16	-.259	19	.281
3	27	.327	31	-.206	3	26	-.017	24	-.061**
4	21	-.118	21	.012	4	19	.102	22	-.546
5	21	-.217	26	.319	5	22	-.023	21	-.068
6	22	-.107	26	.121	6	21	.359	29	-.230
7	19	.136	15	-.233	7	17	.065	19	-.293
8	19	-.077	21	-.348	8	25	-.271	27	.094
9	25	-.096	23	.042	9	18	.193	19	.182
10	21	-.607**	22	-.188	10	21	-.301	19	.014
				First Grade					
1	17	.316			1	21	-.120		
2	20	.042			2	23	-.190		
3	22	.031			3	20	-.354		
4	20	.338			4	23	-.174		
5	14	-.057			5	24	.100		
6	18	.306			6	16	.456		
7	25	.001			7	23	-.084		
8	17	-.073			8	17	.195		

**Significant at .01 level

[a] Based on May, 1960 data

Table 12. Pearson *r*-Values for the Correlation of I.Q. and Picture Test Scores[a] for Experimental and Control Sub-Samples

	Kindergarten					First Grade			
	Control		Experimental			Control		Experimental	
School	N	*r*	N	*r*	School	N	*r*	N	*r*
1	30	.538**	27	.008	1	13	-.228	16	.166
2	33	.001	27	.184	2	16	.198	18	.226
3	36	.094	43	.135	3	18	-.417	11	-.154
4	28	.198	31	.126	4	16	-.125	19	.448
5	21	.049	30	-.234	5	13	.358	21	.155
6	42	.234	31	.560**	6	17	.198	12	.064
7	24	-.132	14	.270	7	18	.656	16	-.174
8	30	-.201	36	.123	8	12	-.674*	11	.272
9	30	.338	20	-.109					
10	31	.001	38	.233					

*Significant at .05 level

**Significant at .01 level

[a] Test Scores from September, 1960

Table 13. Pearson r-Values for Correlation of I.Q. Scores and the Lowest and the Highest Quartiles of Each Class on the Picture Test[a]

Group	N	Lowest Quartile	N	Highest Quartile
First Grade E	32	.448*	31	.157
First Grade C	32	.258	29	.024
Kindergarten E	53	.435**	52	.134
Kindergarten C	52	.182	54	.029

*Significant at .05 level

**Significant at .01 level

[a] Administered in September, 1960

Table 14. F-Values[a] for Speech and Discrimination Tests[b] of Experimental Versus Control Sub-Samples of Boys and Girls

Test	Boys	Girls
	Kindergarten A.M.	
Discrimination	.61	.84
Picture	.06	2.23
Imitation	.33	.44
Combined	.13	.06
	Kindergarten P.M.	
Discrimination	.01	8.08*
Picture	5.60*	.65
Imitation	8.27*	.04
Combined	8.09*	1.11
	First Grade	
Discrimination	.44	4.58
Picture	10.68*	1.56
Imitation	2.17	1.36
Combined	6.54*	1.71

*Significant at .05 level. $F_{.05}$ for 1, 9 d.f. = 5.12; for 1, 7 d.f. = 5.59

[a] Lindquist's Treatments by Subjects Design

[b] Based on May, 1960, Data

Table 13. F-Values[a] for Speech and Discrimination Tests[b] of Boys Versus Girls in the Experimental and Control Sub-Samples

Test	Control F	Experimental F
	Kindergarten A.M.	
Discrimination	.34	1.62
Picture	1.06	.33
Imitation	1.40	.31
Combined	1.36	.47
	Kindergarten P.M.	
Discrimination	.75	2.60
Picture	20.26**	1.31
Imitation	20.94**	.26
Combined	13.22**	.82
	First Grade	
Discrimination	.79	2.32
Picture	4.07	1.20
Imitation	2.31	3.39
Combined	3.47	2.96

** Significant at .01 level . $F_{.05}$ for 1.9 d.f. = 5.12; for 1, 7 d.f. = 5.59

[a] Lindquist's Treatments by Subjects Design

[b] Based on May, 1960, data

Table 16. Occupations of Mothers of Children in Speech Improvement Project, According to Socioeconomic Groups

		Percentages				
Socio-economic Group	N	Housewife	Working	N	Housewife	Working
		First Grade			Kindergarten	
High						
E	45	93.3	6.7	145	91.0	9.0
C	30	93.3	6.7	145	88.9	11.1
Middle						
E	98	79.6	20.4	144	86.1	13.9
C	101	80.2	19.8	180	81.7	18.3
Low						
E	23	73.9	26.1	122	72.1	27.9
C	20	90.0	10.0	124	68.5	31.5
Total						
E	166	82.5	17.5	411	83.7	16.3
C	151	85.4	14.6	449	80.4	19.6
	317			860		

Table 17. F-Values[a] for Wichita Experimental and Control First Grade Sub-Samples on Reading Achievement Tests

Test	F
Metropolitan Achievement Test Primary I Battery[b]	
Word Knowledge	16.70**
Word Discrimination	2.06
Reading	.65
Metropolitan Achievement Test Primary II Battery[c]	2.32
Word Knowledge	3.06
Word Discrimination	3.20
Reading	2.96
Spelling	
Iowa Tests of Basic Skills[d]	
Vocabulary	1.19
Reading	1.30
Language	.20

** Significant at .01 level

[a] Lindquist's Treatments by Subjects Design. $F_{.05}$ for 1, 5 d.f. = 6.61; $F_{.01}$ for 1, 5 d.f. = 16.26

[b] Given in March, 1960

[c] Given in September, 1960

[d] Given in September, 1961

Table 18. t-test Results of Comparison of Lawrence Experimental and Control First Grade Sub-Samples on Reading Achievement Tests

Test	t
Science Research Associates Achievement Series E 1-2[a]	
Verbal-Pictorial Association	.90
Language Perception	4.19**
Comprehension	.76
Vocabulary	.41
Science Research Associates Achievement Series 2-4[b]	
Comprehension	.62
Vocabulary	.04

** Significant at .01 level

[a] Given in April, 1960

[b] Given in October, 1961

Table 19. Pearson r-Values for Correlation of Combined Speech and Spelling[a] Scores of Wichita First Grade Sub-Samples

Control			Experimental		
School	N	r	School	N	r
1	11	.482	1	15	.337
2	16	-.016	2	18	.394
3	18	-.029	3	16	.086
4	16	.329	4	19	.432
5	13	.093	5	21	-.381
6	16	.360	6	12	.027

[a] Spelling section of the Metropolitan Achievement Test, Primary II Battery. Both sets of tests were administered in September, 1960.

Table 20. F-Values[a] for Speech Scores of Experimental and Control Kindergarten Sub-Samples

Period	Picture	Isolated Sounds	Imitation	Combined
Sept. 1959	.03	.05	.63	
May 1960	3.30	5.07*	6.55*	
A.M.	.03	1.44	.75	.37
P.M.	5.34*	10.09*	7.79*	9.37*
Sept. 1960	5.59*		6.37*	6.18*
May 1961	.12		.01	.02
Sept. 1961	.49		1.40	1.30
April 1962	.43		1.18	.20

*Significant at .05 level. $F_{.05}$ for 1, 19 d.f. = 4.38; $F_{.05}$ for 1, 9 d.f. = 5.12

[a] Lindquist's Treatments by Subjects Design

Table 21. Percentages of Perfect Picture Articulation Test Scores in Kindergarten Sub-Samples

Socio-economic Level	Percentage					
	Sept.'59	May'60	Sept.'60	May'61	Sept.'61	Apr.'62
			Control			
High	13.6	29.0	19.1	37.8	46.8	38.8
Middle	9.3	26.4	26.2	49.2	36.8	39.4
Low	1.3	9.6	11.2	29.3	23.9	25.0
Total	8.7	21.8	18.8	46.0	49.4	32.8
			Experimental			
High	11.3	37.9	32.5	38.4	36.0	75.0
Middle	8.7	25.6	29.7	47.9	69.4	39.2
Low	1.2	13.0	24.1	21.6	31.0	26.0
Total	6.9	30.1	33.9	47.9	54.8	31.6

Table 22. Percentages of Invalid Auditory Discrimination Tests in Kindergarten Sub-Samples

Socio-economic Level	Sept. 1959		May 1960		Sept. 1960	May 1961	Sept. 1961	April 1962
	A.M.	P.M.	A.M.	P.M.				
				Control				
High	44.6	30.8	19.4	7.6	17.9	0	0	1.5
Middle	66.0	48.2	25.3	30.7	15.9	4.8	7.9	1.9
Low	82.7	77.1	66.1	68.2	36.1	20.4	19.4	11.6
Total	59.2		36.0		28.8	8.3	8.7	4.4
				Experimental				
High	50.0	31.2	10.9	11.1	9.0	3.6	3.3	2.1
Middle	72.9	41.4	15.3	14.7	9.0	2.4	2.3	1.2
Low	65.9	70.3	45.0	40.3	40.9	25.9	13.8	6.0
Total	56.9		22.0		17.4	12.1	6.3	2.7

Table 23. F-Values[a] for Wichita Experimental and Control Kindergarten Sub-Samples on Reading Readiness and Reading Achievement Tests

Test	F
Lee-Clark Reading Readiness[b]	.35
Primary Reading Profiles[c]	
Aptitude for Reading	.23
Auditory Association	.84
Word Recognition	2.82
Word Attack	.70
Reading Comprehension	1.42

[a] Lindquist's Treatments by Subjects Design; $F_{.05}$ for 1, 6 d.f. = 5.99

[b] Given in September, 1960

[c] Given in September, 1961

Table 24. Pearson r-Values for the Correlation of Reading Readiness[a] and Picture Test Scores of Wichita Kindergarten Sub-Samples

Control			Experimental		
School	N	r	School	N	r
1	32	.632**	1	27	.356
2	35	.191	2	30	.388*
3	37	-.110	3	45	.343*
4	28	.207	4	31	-.183
5	21	.110	5	32	-.050
6	42	.367*	6	31	.451*
7	24	.066	7	14	-.032

*Significant at .05 level

**Significant at .01 level

[a] Both tests were administered in September, 1960

Table 25. F-Values[a] for Reading Readiness Tests of Kindergarten Boys and Girls Within and Between the Experimental and Control Sub-Samples

Group	F
Boys versus Girls, E Sub-Samples	8.58*
Boys versus Girls, C Sub-Samples	7.68*
Girls, E versus C Sub-Samples	.00
Boys, E versus C Sub-Samples	.25

*Significant at .05 level. $F_{.05}$ for 1, 6 d.f. = 5.99

[a] Lindquist's Treatments by Subjects Design

Table 26. F-Values[a] for Speech and Discrimination Tests of Experimental First Grade[b] and Kindergarten[c] Sub-Samples

Test	F.G., Sept.'59 K-Sept.'60 Test Data	F.G., Sept'60 K-Sept.'61 Test Data	F.G., May 1961 K-April, 1962 Test Data
Discrimination	3.16	4.93	1.01
Picture	.57	.21	2.81
Imitation	1.04	.57	.34
Combined	.73	.04	1.46

[a] Lindquist's Treatments by Subjects Design; $F_{.05}$ for 1, 6 d.f. = 5.99

[b] Data from the following schools were utilized: Price, Allen, Jefferson, Lowell, Sunnyside, Schwegler E, Munger

[c] Data from the following schools were utilized: Fabrique, Harris, Black, Clark, McAllaster, Washington

Table 27. Percentages of Sub-Samples Enrolled in Speech Therapy

	Kindergarten		First Grade	
Period	Control	Experimental	Control	Experimental
Sample 1 (Wichita)				
Sept., 1959	2.6	.8	5.5	4.2
Sept., 1960	14.9	9.0	17.9	7.4
Sept., 1961	12.8	7.9	8.5	10.7
April, 1962	15.2	6.3		
Sample 2 (Lawrence)				
Sept., 1959	8.9	9.5	11.6	13.6
Sept., 1960	14.4	10.5	10.0	10.7
Sept., 1961	8.8	13.3	.0	.0

APPENDIX K

Speech Clinicians Who Administered the Speech and Discrimination Tests

1959-60

Miss Betty Berry
Dr. Margaret C. Byrne
Mr. James McLean
Dr. James Neelley
Mrs. Stanley Penny
Dr. Richard Schiefelbusch
Mrs. Lauren Wilson

1960-61

Miss Betty Berry
Dr. Margaret C. Byrne
Mrs. John Davis
Mr. James McLean
Mrs. Stanley Penny

1961-62

Dr. Margaret C. Byrne
Mrs. Edwin Leach
Mr. James McLean
Mrs. Gladys Stavely

Coordinators

Mr. William McClelland, Director of Speech and Hearing Program, Lawrence Public Schools

Miss Betty Berry, Speech Clinician, Wichita Public Schools

School Administrators

Lawrence

Dr. William Wolfe, Superintendent

Dr. Eldon Breazier, Director of Curriculum

Wichita

Dr. Lawrence H. Shepoiser, Superintendent

Dr. Alvin E. Morris, Asst. Supt., in charge of Elementary Education

Dr. Gwendel A. Nelson, Director, Educational Research

Mr. Robert Ohlsen, Director, Special Education

Statistical Advisors, University of Kansas

Dr. John DeJung, Research Associate, Parsons State Hospital and Training Center

Dr. Dale Scannell, Assoc. Prof., School of Education

Dr. Joseph Spradlin, Field Director, Parsons Language Project

Dr. Harris Winitz, Research Associate, Bureau of Child Research

APPENDIX L

Participating Schools by Grade Level, Socioeconomic Status, and Experimental or Control

Experimental

School	Status	Teacher	Principal
Wichita Kindergartens			
Black	Middle	Mrs. Mary Jane Koontz	Mr. Oscar T. Carr
Clark	Middle	Mrs. Velma Klotz	Miss Esther A. Ball
Fabrique	High	Miss Vera Taylor	Miss Hallie Asbill
Field	Middle	Mrs. Jean V. Colburn	Mrs. Margaret Harrington
Harris	High	Miss Virginia Stewart	Miss Nan Wade Mr. Charles Myers
Isely	Low	Mrs. Venice Earp	Mr. Julius McLaurian
Washington	Low	Miss Lucile Nickels	Mr. Kenneth K. Kaufman
Lawrence Kindergartens			
Centennial	High	Miss Mary Cravens	Mr. William Howard Mr. Ira Williams
McAllaster	Middle	Mrs. Clea Perry	Mrs. Doris Sindt Mr. Calvin Rice
Woodlawn	Low	Mrs. Albert Casey	Mr. Harold Siegrist
Wichita First Grades			
Allen	High	Mrs. Gladys Cummins	Miss Roxa M. Porter
Jefferson	Middle	Miss Edna Huff	Miss Laura Houk
Lowell	Middle	Miss Ann Longstaff	Mr. Everett S. Cole
Munger	Low	Mrs. Lazetta Pruitt	Miss Dorothy McCabe
Price	High	Miss Bertha Boyle	Dr. A.W. Dirks
Sunnyside	Middle	Mrs. Olivia Miller	Miss Nina Haws
Lawrence First Grades			
Cordley	Middle	Mrs. Lois Leitner	Miss Hazel Simmons
Schwegler	Middle	Mrs. Frances Cox	Miss Helen Norwood

School	Status	Teacher	Principal
Control			
Wichita Kindergartens			
Chisholm	Middle	Mrs. Mina Crump	Mr. Floyd Pope
Woodland	Middle	Mrs. Lois Parsons	Miss Ruth Crossfield
Adams	High	Mrs. Pauline Ward	Mr. John O. Bowden
Harry Street	Middle	Miss Julia Caldwell	Mr. Earnest Kaufman
College Hill	High	Mrs. Beverly Pendleton	Dr. Walter Smith
Ingalls	Low	Mrs. Collotta Guest	Mr. Roy Taylor
Lawrence	Low	Miss Anna Pierce	Mrs. Fern Ritter
Lawrence Kindergartens			
Hillcrest	High	Mrs. Marlene Novotny	Miss Opal Jayne Kennedy Miss Doris Johnson
East Heights	Middle	Mrs. Nancy Morrow	Miss Cecelia Pearson
New York	Low	Mrs. Lois Stuth	Miss Mildred Kirkham
Wichita First Grades			
Booth	High	Mrs. Leona Sparks	Dr. Benjamin Mevey
Mueller	Middle	Mrs. Bernice Comstock	Dr. F. George Farmer
Willard	Middle	Mrs. Edith Bonicamp	Mr. Arwyn Keith Esch
Martinson	Low	Mrs. Helen Justice	Mr. Kenneth Wolf Miss Marjorie May
Hyde	High	Miss Dorothy Carson	Miss Gertrude Hatfield
Riverside	Middle	Mrs. Mary Brinkman	Miss Margaret M. Barnes
Lawrence First Grades			
Cordley	Middle	Mrs. Ruth Wood	Miss Hazel Simmons
Schwegler	Middle	Mrs. Blanche Replogle	Miss Helen Norwood